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QUARTO VOL. XXIV.—NO. 31. A JOURNAL OF TRANSPORTATION ENGINEERING AND RAILROAD NEWS. THIRTY-SEVENTH YEAR.

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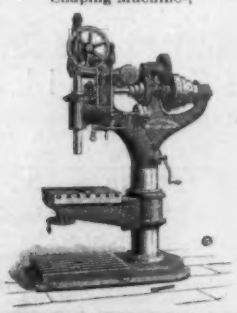

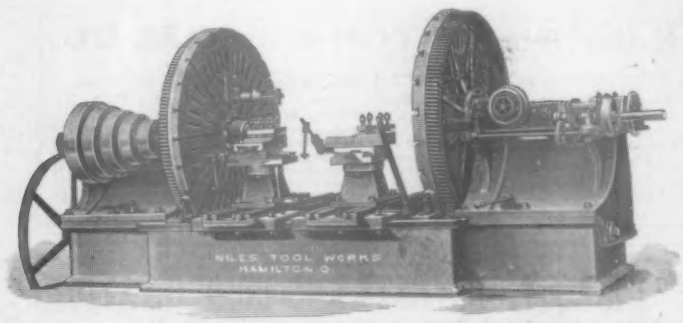

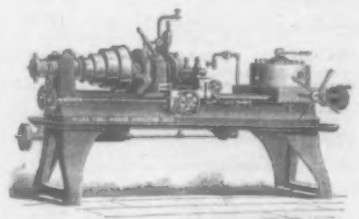

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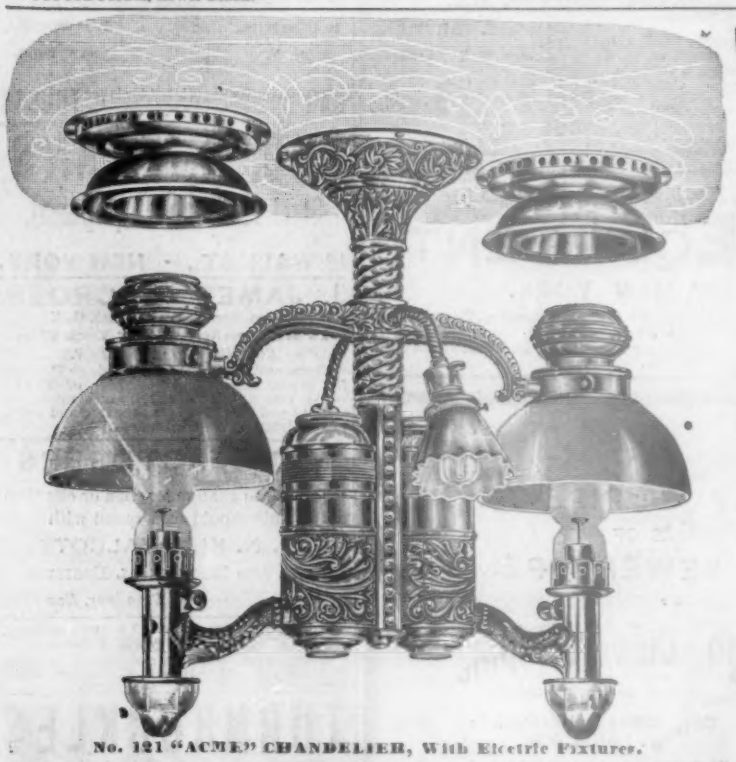

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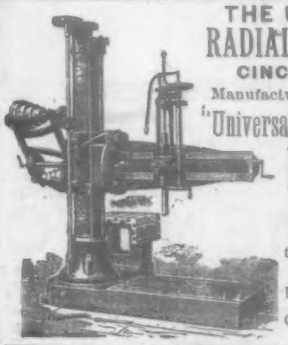

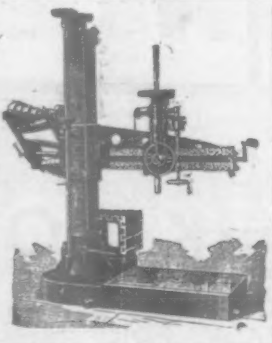

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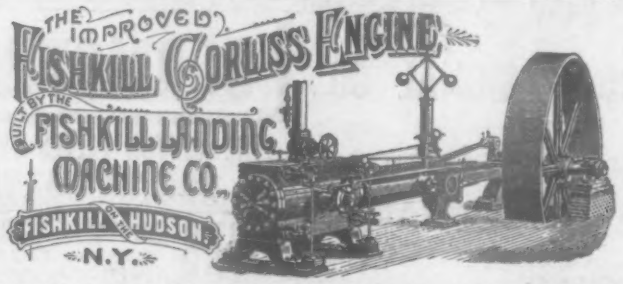

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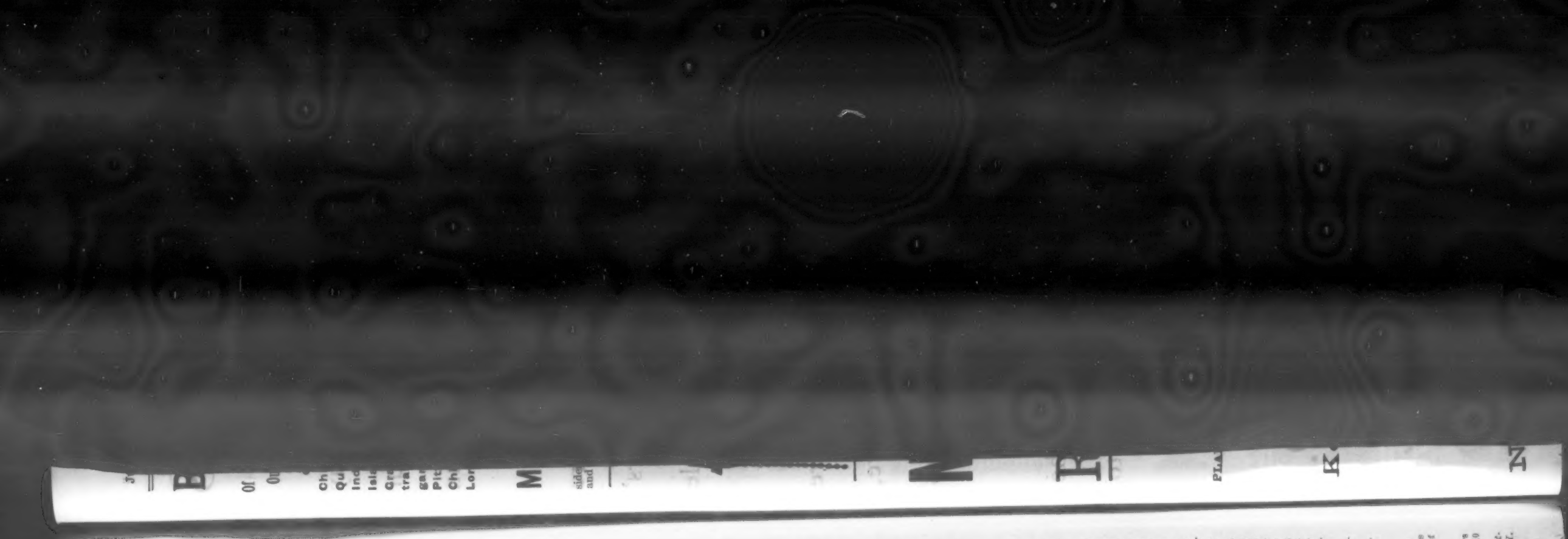

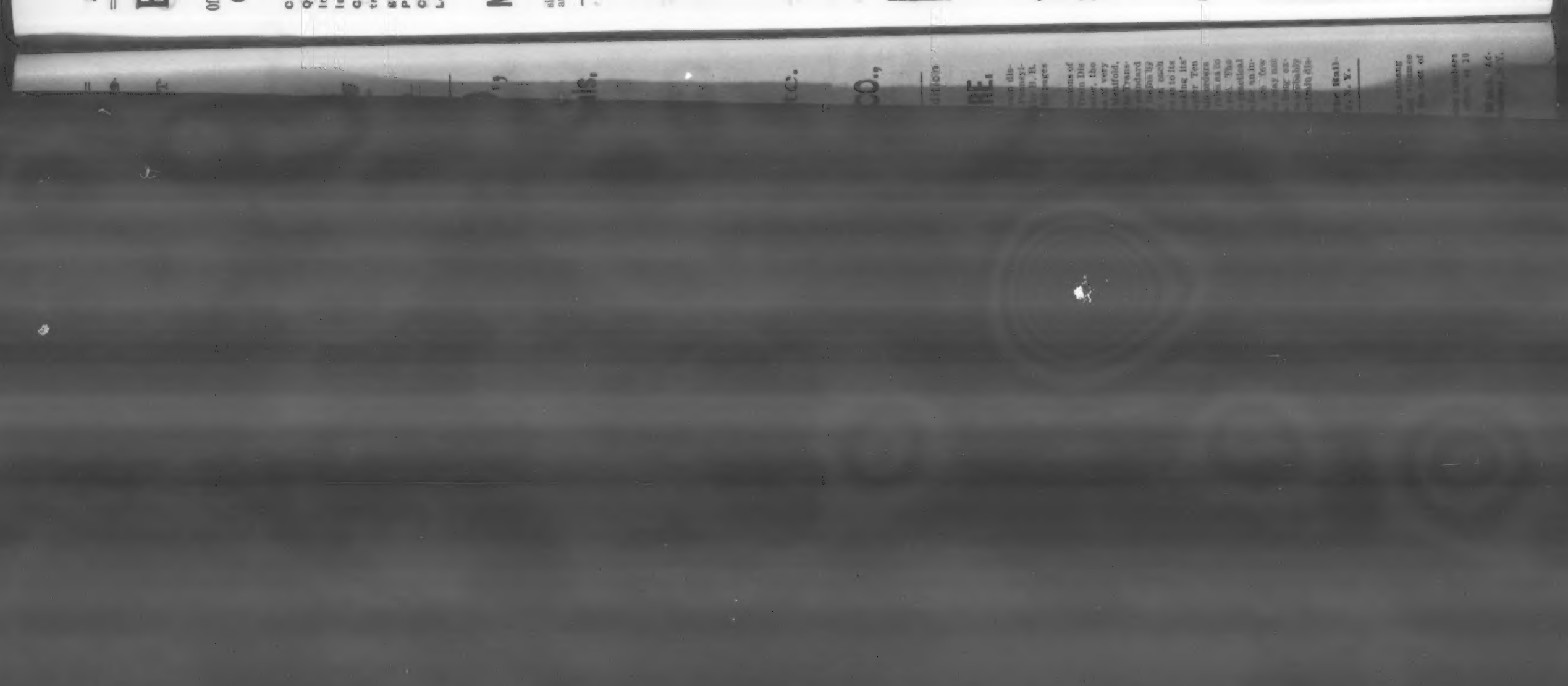

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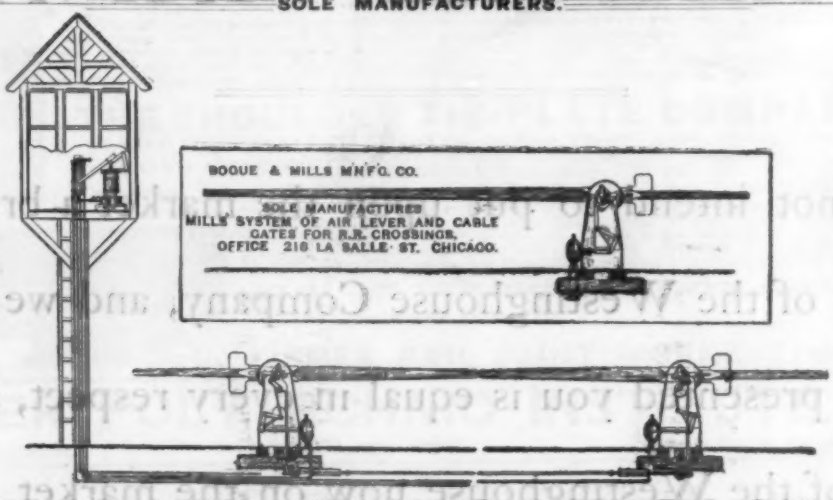
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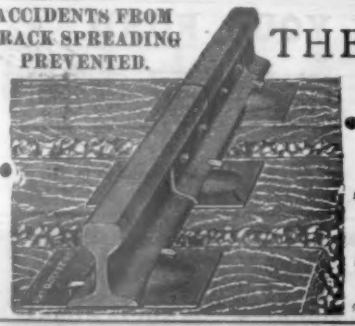

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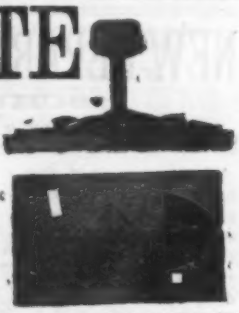

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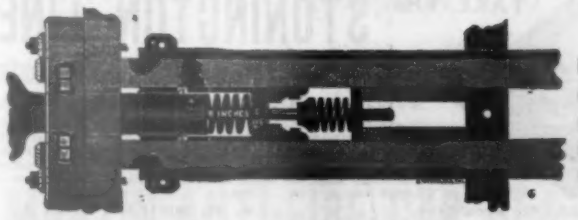

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Creosote Lumber & Construction Co. Fernandina, Fla.
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Blackmer & Post, St. Louis Mo.
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Butler Drawbar Attach. Co., Cleveland.
Hinson Drawbar Attach. Co., Chicago.
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Bucyrus (O.) Steam Shovel & Dredge Co.
San Francisco Bridge Co., California.
Vulcan Iron Works, Chicago
Vulcan Iron Works, Toledo.
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Billings & Spencer Co., Hartford, Conn.
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Electric Supply & Mfg. Co., Clevel'd, O.
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Northampton Emery W. Co., Leeds, Mass.
Tanite Co., Stroudsburg, Pa.
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Heller & Brightly Philadelphia, Pa.
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Keuffel & Esser, New York City.
Queen & Co., Philadelphia Pa.
Young & Sons, Philadelphia, Pa.
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D. L. Barnes, The Rookery, Chicago.
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S. W. Frescoln, World Bldg., N. Y.
Geo. L. Fowler, 52 Broadway, N. Y.
Albert Lucius, 71 Broadway, N. Y.
W. B. Parsons, 35 Broadway, N. Y.
Chas. Paine & Sons, 71 Broadway, N. Y.
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E. N. K. Talcott, 57 Broadway, N. Y.
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A. S. Males & Co., Cincinnati, O.
Marion Steam Shovel Co., Marion, O.
Osgood Dredge Company, Albany, N. Y.
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Vulcan Iron Works, Toledo.
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Field Water Purifier Co., Chicago.
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Stow Flexible Shaft Co., Phila., Pa.
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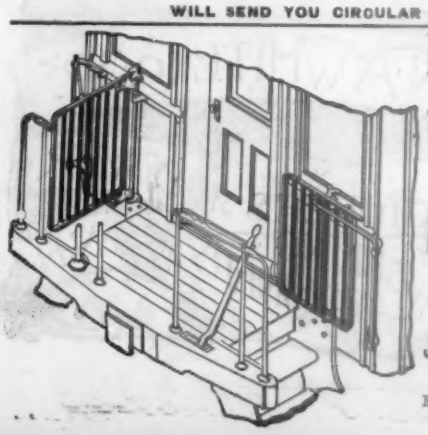

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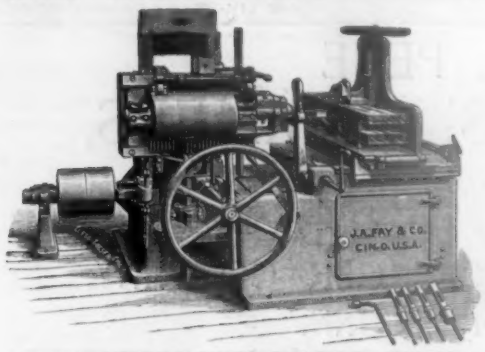

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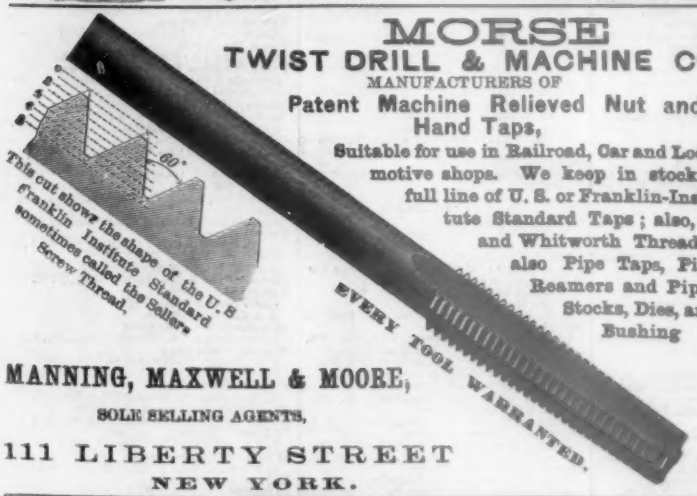
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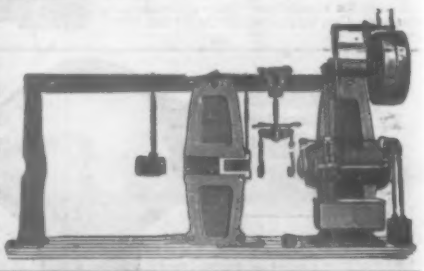

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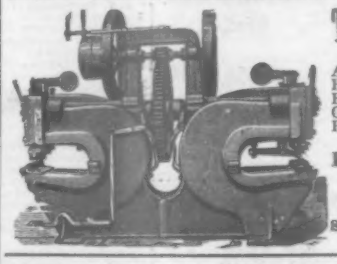

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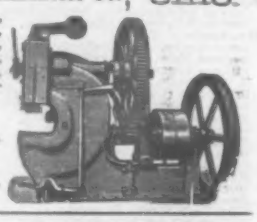

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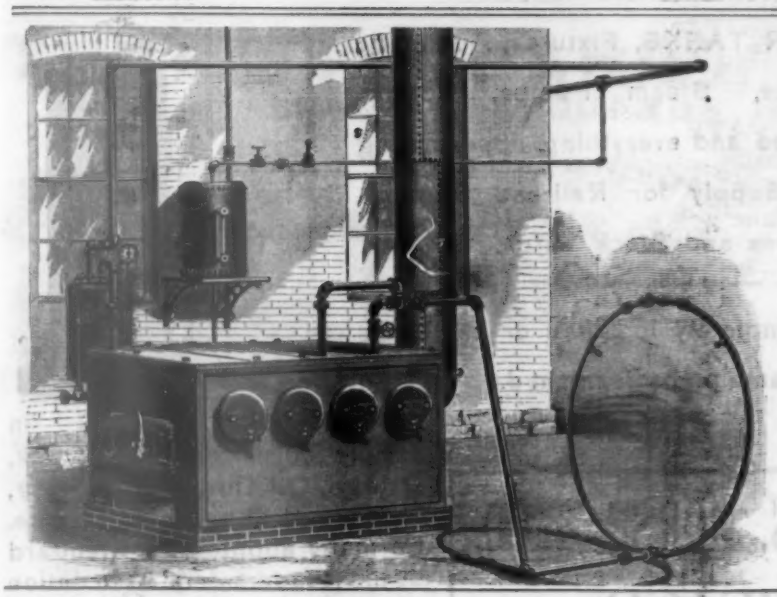

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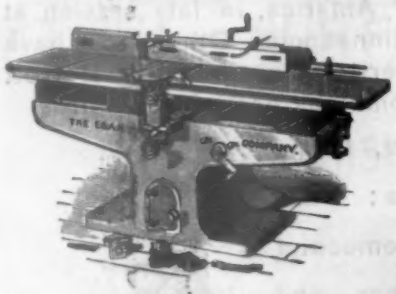

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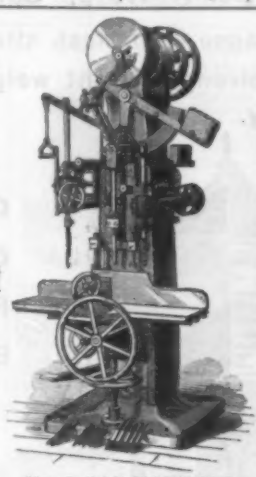

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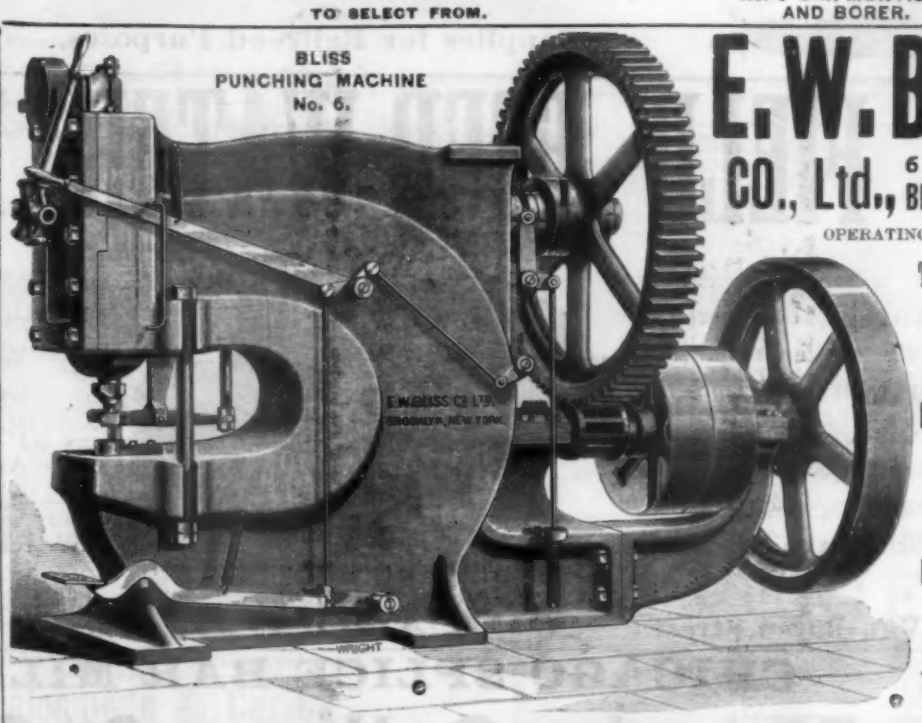

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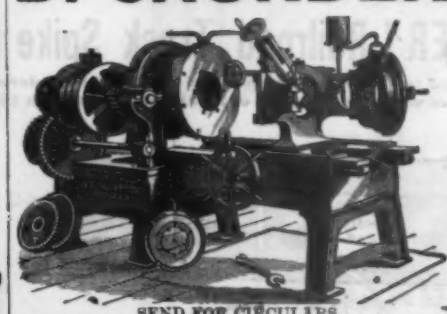

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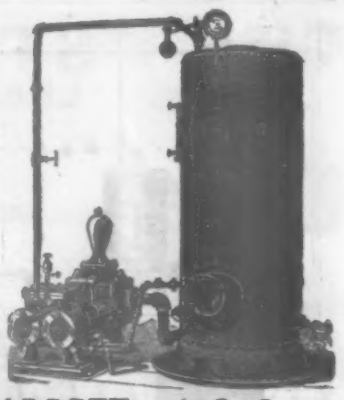

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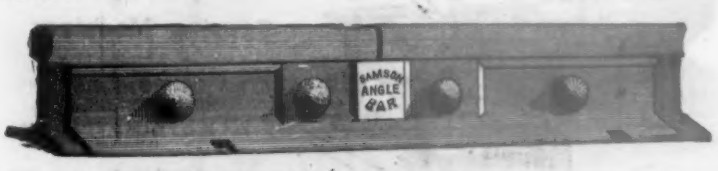

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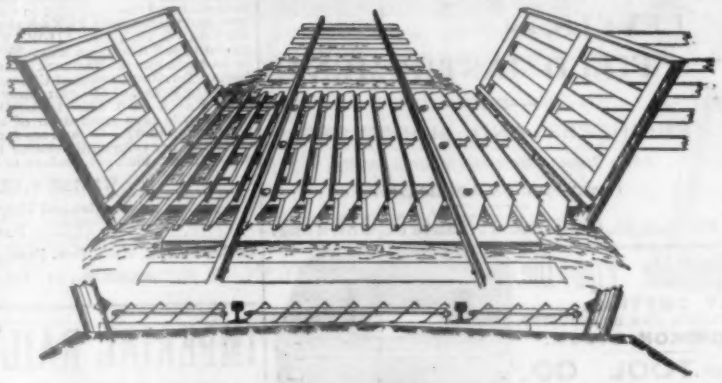

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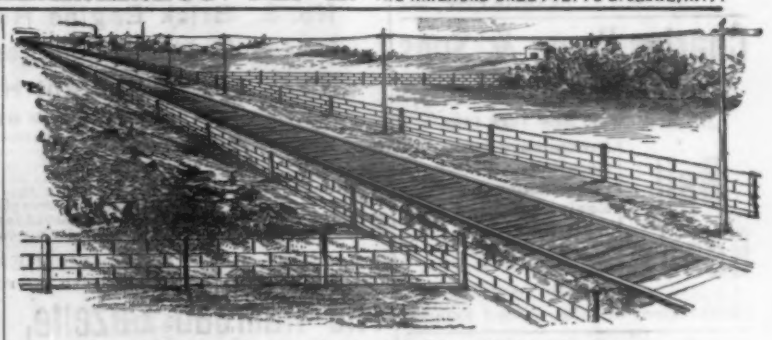

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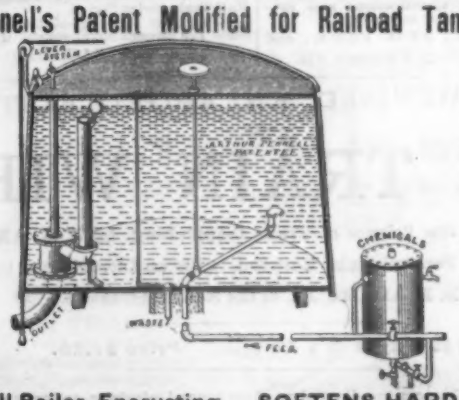

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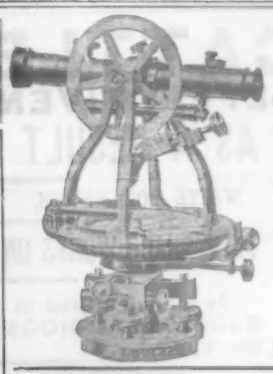

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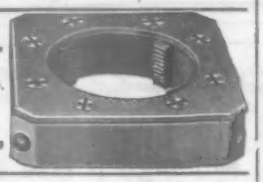

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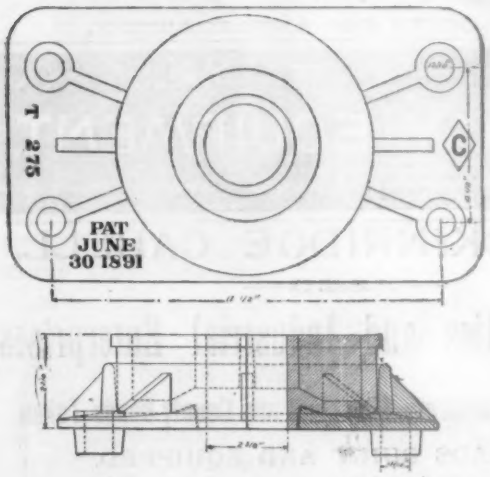

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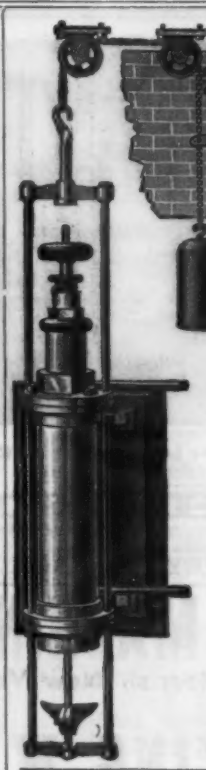

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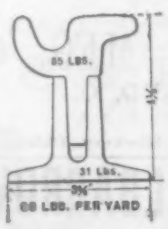

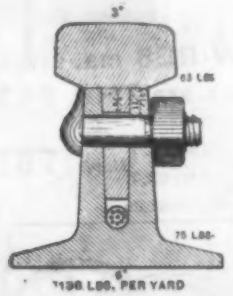

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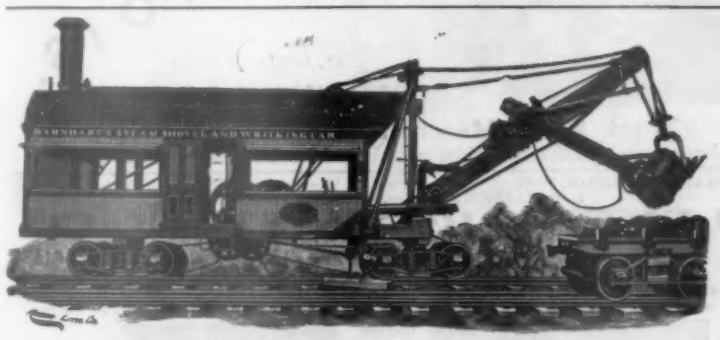

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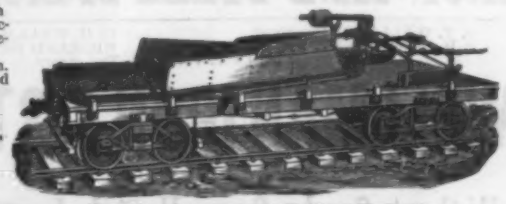

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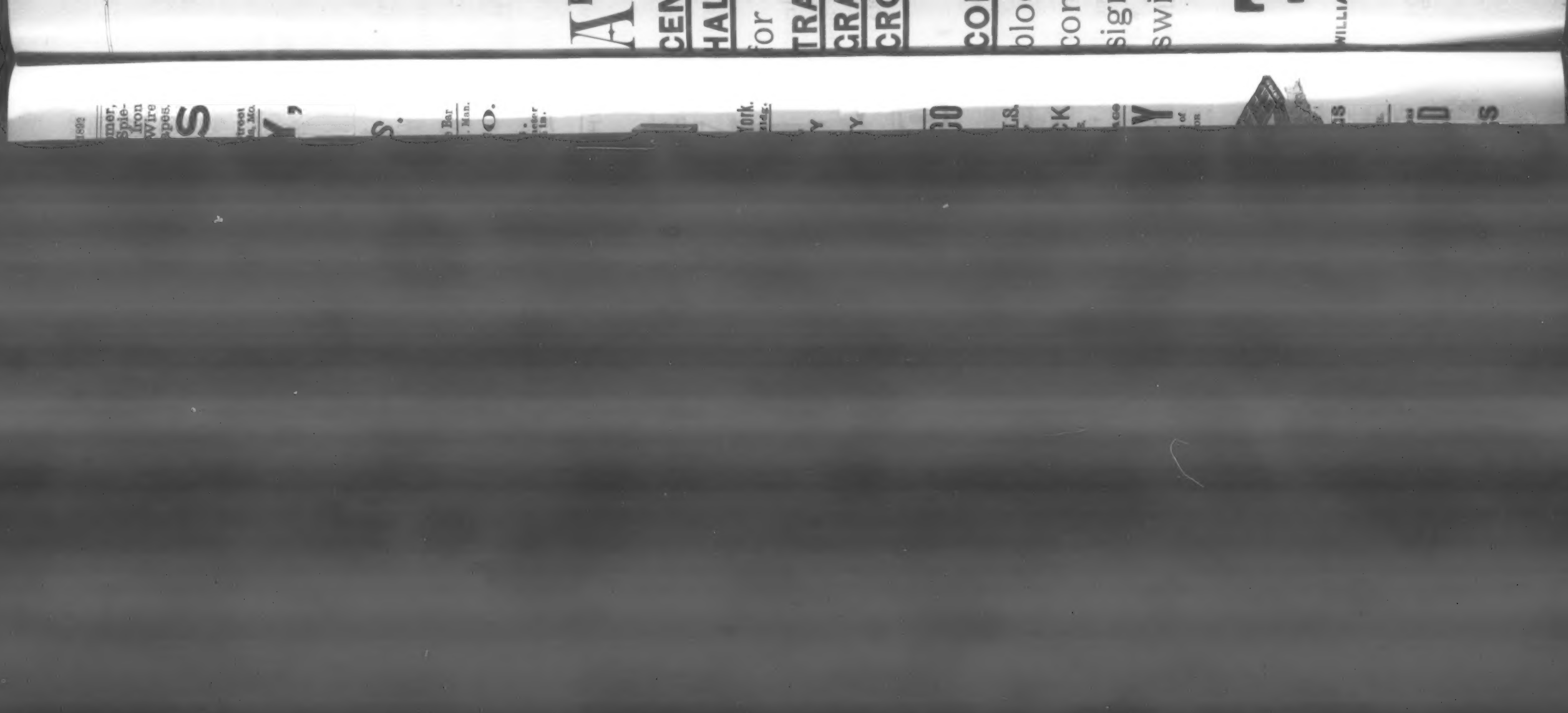

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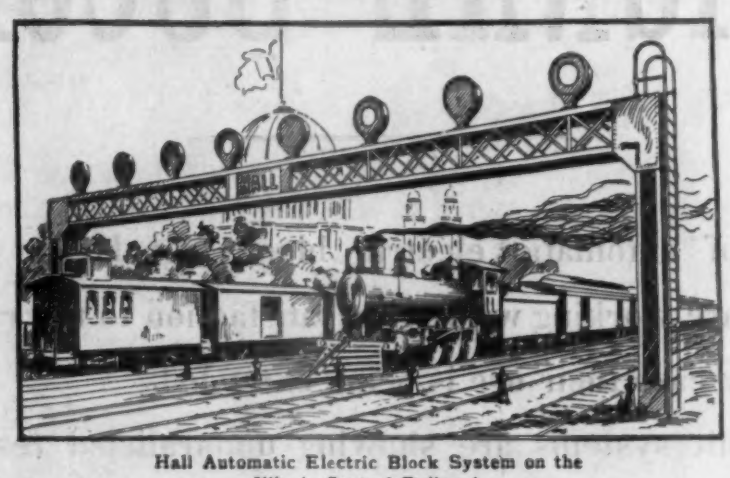

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RAILROAD GAZETTE

FRIDAY, JULY 29.

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Contributions.

The Sykes Patents.

The Hall Signal Company,
NEW YORK, July 25, 1892.

TO THE EDITOR OF THE RAILOAD GAZETTE:

Noting the contribution in your issue of the 22d inst., in which the Union Switch & Signal Company declare that "in their judgment the Bezer Lock and Block is nothing more or less than a part of the Sykes system," permit me to state that the details of my system are not yet published and that I have never been favored with an interview with any officer of that Company, either to explain or show drawings of the same. It would be, therefore, interesting to me to be informed by the Union Switch & Signal Company from what source it has obtained such information as would enable it to give such a positive judgment. HENRY BEZER,

Signal Engineer the Hall Signal Company.

NEW YORK, July 26, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your last issue you published a communication signed "The Union Switch & Signal Co., E. H. Goodman, Vice-President and General Manager," which contains the following statement:

"The control or exclusive license for the manufacture and sale of the Sykes System, under certain royalties, was purchased by the Union Switch & Signal Co. in 1882, and the Union Switch & Signal Co. are in reality the owners and sole manufacturers of this class of signaling in the United States."

Every one connected with the management of that company knows that the statement is utterly false, unless E. H. Goodman has the jurisdiction to reverse the decision of the Circuit Court of the United States. The question was squarely decided some months ago in an action brought by the Johnson Railroad Signal Co. against the Union Switch & Signal Co. Judge Acheson, Chief Judge of the United States Court of Appeals, in Pennsylvania, rendered the decision and wrote the opinion. The Judge held that the paper obtained by the Union Switch & Signal Co. in 1882 gave that company no title. The following is all that need be quoted from the opinion: "Therefore, as an attempted sale of the letters patent it was the unauthorized act of Yeomans and was inoperative to pass title."

There was no question as to the Johnson company having duly purchased and obtained a clear title to the patents, unless this Yeomans' paper conveyed a title to the Union Switch & Signal Co. The Johnson company not only owns the Sykes' patents but is actively engaged in applying the system on the New York Central & Hudson River Railroad, and many other roads.

GEO. W. MILLER,
Counsel for the Johnson Railroad Signal Co.

[In another column appears the full text of Judge Acheson's decision.—EDITOR RAILROAD GAZETTE.]

The Servis Tie Plates and Spike Shearing.

The Q and C Company,
CHICAGO, July 26, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your editorial note following our letter to you of July 12 surprises us greatly, and we have to-day wired you as follows: "Your editorial July 22d does Servis tie plate gross injustice. Full investigation has proven no Servis plates in use in either case, and both roads are good customers and firm advocates of same."

As we have before intimated, reports had come to us which had been investigated and found without any truth whatever. The facts that are given you in our telegram are beyond question positive. We took great pains to go to these points and carefully see the officials of the roads and found that there were no tie plates used. The rumor on the Rock Island was the outburst of an enthusiastic reporter for the Chicago *Tribune*, who, by the writing of this article, lost his position and the paper retracted in the fullest manner. Colonel Parker, Engineer of the Rock Island, has gone so far as to say that if these plates had been in use there would not have been any trouble. They were about to lay some tie plates at a point within a mile of the accident, which was observed by the reporter, but there were none in the track anywhere near where the accident occurred. The Rock Island are regular customers for the tie plate and have expressed their intention of using them in large quantities, being more than satisfied with the results of those in use.

The B. & O. have expressed a desire that they might use them in very large quantities and we have filled several orders for them; only this week one of considerable size.

We feel that it is only right that you set this matter right, and very clearly, before your readers in view of the fact that you are willing to take, as before stated, what a responsible officer of a large system told you he had heard by correspondence. C. F. QUINCY, *Treasurer.*

Bending Rails on Curves.

CHICAGO, July 20, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the last sentence of the editorial on the bending of rails, issue of July 8, it is stated that "after discussion the resolution was modified to apply only to curves of three degrees." Does this mean that rails are to be bent only for curves of that degree? I take it to mean only on curves greater than three degrees.

J. G. B.

[The section as adopted reads "Rail benders should not be used for curving rails on curves of less than three degrees, but should be used on three-degree curves and upward." The sense of the section is evident, and there can be no mistake if one reads the original wording and the discussion. But a verbalist like "J. G. B." will see that there is still an obscurity. One is left free to bend rails on curves of less than three degrees by the use of other means than a rail bender. The intention of the Association was to provide that rails should be bent by a rail-bender if bent at all; and that they should not be bent for curves of less than three degrees; but should be bent for all curves of that degree, or sharper.—EDITOR RAILROAD GAZETTE.]

GREENWOOD, S. C., June 21, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

My observation and experience has shown me that a good trackman can always adjust a track to any curve required without first bending the rails before laying, without undue strain on the inner spikes, except at the joints. Here the rail is rarely ever brought to the true curve unless it has been curved in a rail bender or by some proper application of force to give it the required shape near the ends. An ordinary steel rail can be easily curved at and near the middle; but to give the end quarters the proper curve requires special appliances and the application of great pressure. Unless the rail has been carefully curved near the joint, there will be found at every joint in a track an angle or bend, be the curve greater or less. This angularity being very small in curves of long radius, is not evident on careless inspection. As the radius of the curve is shorter this defect becomes greater, and more apparent.

I think a good line can always be had on any curve up to 8 deg. by laying the rails without previous curving. The ends, quarters and middle of a rail can be brought and held to the curve with very little strain on the spikes. The holding of the rail in the end quarters to the curve causes great strain on the spikes. After the track is laid and bolted up, the rail bender should be applied at the joint and on the end quarters and the rail bent to the curve; this relieves the spikes and takes out the angularity of the joint. It requires time, money and great care to bend or curve rails before laying and it will rarely be submitted to.

As to whether a supported or suspended joint is best. Judging from what we see all around us, it seems to make really little difference whether the joint is supported or suspended. I prefer a supported joint for this, among other reasons, that it enables us to space our ties evenly. An essential element of a good track is ties spaced evenly and at right angles to the rail. Two good angle splice bars, not exceeding 30 in. in length, thickened opposite the joint, with bearings under the rail head of not less than ¾ in., with four bolts not exceeding ⅞-in. diameter, according to weight of rail, makes a satisfactory joint, supported or suspended.

THOS. B. LEE.

Scientific Car Ventilation.

TO THE EDITOR OF THE RAILROAD GAZETTE:

There is no mistaking the fact that there has been in the main no improvement whatever in car ventilation for 30 years past. In fact, the old single roof cars with wickets in the frieze and four or five Emerson ventilators in the roof were far better ventilated than thousands of cars running to-day.

There is no reason in this. It surely cannot be a difficult thing to ventilate a railroad car perfectly. A railroad car is a thing of motion; there is power to force air in as well as to force it out. It is within the province of mechanical engineering to so employ these forces as to produce proper circulation. The long, narrow windows in the upper part of the car are about as rude and impracticable as anything can be. They are about the arrangement we would use for a foundry, railroad depot or any other stationary building, but not at all the thing for a car.

It is not the average day car, especially in midsummer, where foul air is present. It is the night car or day car which runs far into the night when windows are closed that demands attention. It is fair to assume that cars must have some kind of appliances for ventilation and we can hardly doubt but that it will cost less money to do the job well than to continue the present delusive methods. C. G. W.

Shrinkage Allowance of Driving Tires.

The Pratt & Whitney Co.,
HARTFORD, Conn., July 20, 1892.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to the communication of the Midvale Steel Co., in your issue of July 15th, relative to shrinkage allowances for driving wheel tires, I take the liberty of sending inclosed a copy of the circular issued by the Secretary of the American Railway Master Mechanics' Association in 1886, covering the six standard sizes *adopted* by them at that time, and which gives definitely the amount of allowance for shrinkage for each adopted wheel centre diameter.

It is gratifying to notice that the difference in amounts recommended by the Midvale company for corresponding diameters is so small, none in one instance, and not over 0.002 in. in the greatest, so that reducing the number of so called "special diameters" of centres to the smallest possible, and by maintaining a definite standard amount for shrinkage allowance for each, will lend itself to economy in every sense of the word, both to the producer and the user.

GEO. M. BOND, *Manager Gauge Dept.*

(Extract from Circular of M. M. Association.)

The sizes represented for inside diameter of tire, for each of the six gauges in the full set, are as follows:

38-inch, less 0.040 inch = 37.960 inches.
44-inch, less 0.047 inch = 43.953 inches.
50-inch, less 0.053 inch = 49.947 inches.
56-inch, less 0.060 inch = 55.940 inches.
62-inch, less 0.066 inch = 61.934 inches.
66-inch, less 0.070 inch = 65.930 inches.

Safety Legislation.

In our issue of July 15 we published the O'Neill bill, which passed the House of Representatives, and last week we were led by the press dispatches to say that this bill had been somewhat amended by the Senate committee. In fact, it has been amended out of existence. The amended bill which we shall call the Cullom bill, as it has been reported by that Senator, follows. The changes from the O'Neill bill are radical, and if it passes the Senate the House may refuse to concur.

SEC. 1. From and after the first day of January, 1895, it shall be unlawful for any common carrier, etc., to use on its line any locomotive engine in moving interstate traffic not equipped with a power driving-wheel brake and appliances for operating the train-brake system, or to run any train that has not a sufficient number of cars in it so equipped with power or train brakes that the engineer can control its speed without requiring brakemen to use the common handbrake for that purpose.

SEC. 2. That on and after the first day of January, 1893, it shall be unlawful for any such common carrier to haul or permit to be hauled or used on its line any car used in moving Interstate traffic not equipped with couplers uniform in type and action, coupling automatically by impact, and which can be uncoupled without the necessity of men going between the ends of the cars. And said uniform automatic coupler shall always be of the standard type established by such common carriers controlling 75 per centum of the cars used in such traffic. Said common carriers shall report to the Interstate Commerce Commission within one year from the date of the passage of this act the standard type of automatic couplers so established, but on failure to do so the said Commission shall designate and publish properly the type of couplers to be used.

SEC. 3. That when any person, firm, company or corporation engaged in interstate commerce by railroad shall have equipped a sufficient number of its cars so as to comply with the provision of section one of this act, it may lawfully refuse to receive from connecting lines of road or shippers any cars not equipped sufficiently, in accordance with the first section of this act, with such power or train brakes as will work and readily interchange with the brakes in use on its own cars, as required by this act.

SEC. 4. That from and after the first day of July, 1893, until otherwise ordered by the Interstate Commerce Commission, it shall be unlawful for any railroad company to use any car in interstate commerce that is not provided with secure grab irons or handholds in the ends and sides of each car for greater security to men in coupling and uncoupling cars.

SEC. 5. That within 90 days from the passage of this act the American Railway Association is authorized hereby to designate to the Interstate Commerce Commission the standard height of drawbars for freight cars . . . and shall fix a minimum variation from such standard height to be allowed between the drawbars of empty and loaded cars. Upon their determination being certified to the Interstate Commerce Commission, said Commission shall at once give notice of the

standard fixed upon, etc. . . . and therefore all cars built or sent to the shops for general repairs shall be of that standard. But should said association fail to determine a standard as above provided, it shall be the duty of the Interstate Commerce Commission to do so. And after July 1, 1893, no cars, either loaded or unloaded, shall be used in interstate traffic which do not comply with the standard above provided for.

SEC. 6. That any such common carrier using any locomotive engine, running any train, or hauling or permitting to be hauled or used on its line any car in violation of any of the provisions of this act, shall be liable to a penalty of $100 for each and every such violation, to be recovered in a suit or suits to be brought by the United States district attorney in the district court of the United States having jurisdiction in the locality where such violation shall have been committed, and it shall be the duty of such district attorney to bring such suits upon duly verified information being lodged with him of such violation having occurred. And it shall also be the duty of the Interstate Commerce Commission to lodge with the proper district attorneys information of any such violations as may come to its knowledge.

SEC. 7. That the Interstate Commerce Commission may from time to time upon full hearing and for good cause extend the period within which any common carrier shall comply with the provisions of this act.

Altoona Yard—Pennsylvania Railroad.

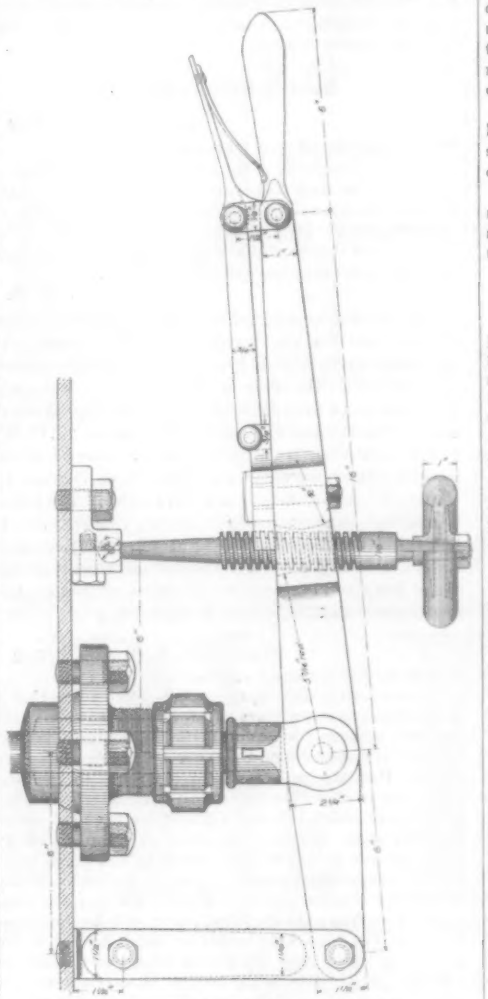
The Pennsylvania Railroad, being a trunk line between the West and the Atlantic seaboard and also an outlet to the East for the soft coal mines and the extensive industries of Western Pennsylvania, enjoys an immense freight traffic in spite of its heavy grades, and the eastbound movement over its main line is probably the heaviest on any one line of equal length in the country. This necessitates distributing yards of great capacity, and those at Altoona and Harrisburg have long been known as two of the busiest in the country. The latter was described in the *Railroad Gazette* several years ago* in connection with the first published account of the method of poling or staking cars—instead of backing off—as a quick method of distributing a long freight train. The yards at Philadelphia and Pittsburgh are also very large. At Pittsburgh, or rather at Walls, 15 miles east of the city, where freight from the Pittsburgh, Cincinnati, Chicago & St. Louis is received by a line that runs around and outside of the city, a large new yard has lately been built. The chief characteristic of this yard is that it had to be constructed at great expense mostly on made ground, the natural topography being very uneven throughout the entire region; and for the same reason many important tracks had to be laid on pretty sharp curves.

We print herewith a plan, slightly distorted in some minor particulars, of the Altoona yard, which has lately been enlarged and rearranged. It now has certain conveniences seldom found in large yards, and comes as near being a gravity yard as anything we know of in this country. This place combines three features not often found together: 1, a large freight traffic; 2, a tract four miles long, on which tracks could be laid on an easy, uniform, descending grade (32 ft. per mile), without much filling; 3, moderate prices for land. This last advantage is not so great as to cause any exuberance of joy, however, as Altoona is a growing city.

The first important peculiarity noticed on the diagram is the ample length of the poling tracks in the eastbound yard. The eastbound traffic is much heavier than the westbound. The distance from E^1 to E^2 is about 2,500 ft., so that the longest train can be placed upon the track for distribution, and can be run there from any one of the receiving tracks without moving it up the grade. This track and the uniform descending grade are the principal features in which this yard is superior to that at Hawthorne, Ill., on the Chicago, Burlington & Quincy, which was described in the *Railroad Gazette* of December 13, 1889.

The principal novelty, however, is not shown on the diagram. It is the arrangement of the switch movements in the eastbound distributing or classification yard, which is the part recently completed. These switches, operated from tower W N, and leading to tracks 1 to 16 east of the tower, are worked by pneumatic power and the valves admitting air to the air cylinders are controlled by electricity, two electromagnets at each switch being opened or closed by pressing a button in the tower. The electric apparatus is furnished by the Union Switch & Signal Co., and the system differs from that company's latest form of pneumatic interlocking, chiefly in being non-interlocking, and in the number of electromagnets at each switch, the interlocking apparatus having a third to act as a lock. These switches are facing points, but they have no locks or detector bars. There are no signals except a lamp, about 8 in. above the rail, opposite each switch, and turned a quarter turn, on a vertical spindle, by the movement of the rail. The cars being pushed from the track E^1, E^2 above W N the attendant in the tower sets the switches entirely by the printed list given to him by the conductor; but as an additional convenience the hind end of the last car in each lot has chalked upon it the number of the track which is to be opened for the next lot. This cannot be of great value at night, however, though the yard is lighted by — — candle power electric lights on posts — ft. high set along each side — ft. apart. The furthest switch operated from W N is about 1,500 ft. away; this or any one of them is likely to need to be turned when hidden from view by a car; and to provide for these conditions the operator is provided with two sets of electric indicators in a case in front of him. In one set the indicators are worked by the switches, an electric circuit being closed when the switch rail is completely "home," and the others are worked by a rail circuit so arranged as to operate the indicator when a car has gone into its track far enough to clear the ladder track. These wires, as well as those for actuating the switch valves, are carried in boxing fixed upon short posts after the manner commonly used for mechanical signal wires. The air pipe, which is supplied with 60 lbs. pressure from the compressor in the Juniata shosp (west of the red bridge), is carried on another row of posts. It is of galvanized iron — in. in diameter, and the switches work, for all practical purposes, instantaneously.

The distributing engines which "pole" the cars in the eastbound yard have each a crew of 16 brake men. In such a long yard the travel imposed upon these men is considerable and an engine has to be regularly employed to pick them up after they have ridden the cars to the easterly part of the tracks (to near N D) and carry them back to E^2. When a man stops his cars near the westerly end of one of the tracks it may, of course, be more convenient to walk back. This pickup engine runs on track No. 18. It might just as well be a vehicle costing $1,000 as one costing $5,000, and the company is likely to design something specially fitted for the service. By the erection of a trolley wire an electric car similar to those used in street railroad service might be used, as the electric power is close at hand. The electric circuits employed for the switches are, by the way, charged from storage batteries kept in the tower, which in turn are charged by the dynamo at the Juniata shops.



Throttle Lever Rigging—Mobile & Ohio Railroad.

In the westbound yard, which is an older yard, the cars are distributed by moving them eastward the same as in the eastbound yard. The trains as they arrive are pulled into any one of the tracks west of G D (1 to 8), if one is empty, but if not they must be pulled by and backed in.

The most westerly yard (B O to J K) is used chiefly for business to and from the Hollidaysburg branch, which joins the main line at Seventeenth street, and from which large quantities of limestone are received for the furnaces in the vicinity of Pittsburgh.

The freight movement through Altoona is from 2,000 to 3,000 cars a day. The largest number ever handled was nearly 5,000, which, with the passenger trains proved to be about all that could be handled on a two-track road, even when it is liberally supplied with middle tracks for passing.

* Dec. 10 and 24, 1886.

An Electric Advertisement.

At the junction of Broadway, Fifth avenue and Twenty-third street, in New York, may be seen a novelty in advertising. It consists of an illuminated sign, made up of 1,467 16-c. p. Edison lamps, in five colors, arranged on the side wall of a high building in seven sentences, which may be thrown in or out of circuit at will, making a very brilliant effect.

Throttle Lever Rigging.

The improved throttle lever regulator, shown in the accompanying engraving, is the standard of the Mobile & Ohio Railroad. It consists of the ordinary throttle lever, a stuffing box and a regulating device which replaces the ordinary toothed quadrant. This regulator is the main feature—it has all the best qualities of a toothed quadrant, and also allows a nicety of regulation in throttling that is not possible with the ordinary devices. The stuffing box is different from the ordinary practice, as it has a follower nut and a gland, the same as is used on ordinary globe valves. The regulating device is a stem with a screw thread turned upon it, on one end of which is a hand wheel, the other end is turned spherically, and fits into two pieces cut out to receive it. These pieces are attached to the boiler head, and make a ball and socket joint, which accommodates all the motions imparted to the screw thread in regulating or in opening the throttle.

There has been some question raised as to the relative merits of throttling steam with medium cut-offs, and the exclusive use of the reverse lever with full throttle for admittance of steam into the cylinders. It is the opinion of some that with the ordinary Stephenson link motion at very short cut-offs and high speeds, the control of the admission of steam by the reverse levers is not as good nor as efficient as is possible where longer cut-offs are used, and the steam is throttled.

Indicator cards taken under both the above conditions have shown better results, and more efficient use of the steam is in some cases obtainable when the medium cut-off and throttled steam is used.

There are some features of this device that will commend themselves to those interested in having the best appliances for the control of the admission of steam into the cylinders by a throttle.

Storage Battery Traction.

The use of storage batteries for traction purposes appears to be receiving much attention at present, as it is reported that they are to be adopted by the Second avenue surface road in New York and the Kings County Elevated in Brooklyn (!), and they have been actually adopted by the Metropolitan Railroad Co. in Washington, D. C., which operates next to the largest system of street railroads in that city. In regard to the last, it will be remembered that the street railroad companies in Washington have been required by Congress to substitute some form of motive power for horses, and that the use of overhead wires is forbidden.

As a result of this legislation, the Washington & Georgetown Co., which owns the longest lines of street railroads in the District, adopted the cable system, and all of its lines will soon be operated by this means. The Metropolitan Co. decided to use storage batteries, and one of the two proposed plants for charging the batteries and placing them in and removing them from the cars is now partially completed. This is, we believe, the most extensive application of storage batteries to traction purposes which has so far been made.

The gist of the trolley, storage-battery conduit question for street railroads seems to be that the trolley system is the cheapest and is therefore applicable to light traffic lines where other systems would not pay, and, also on account of its cheapness, it is naturally preferred by the street railroad companies in cities where one of the other systems of transmitting power from generator to motor would be found to be practicable if overhead wires were prohibited.

Railroads of the United States in 1891.

We have received advance sheets of Poor's "Manual" for 1892, giving results of operations for 1891 and reproduce certain figures. The first give a general exhibit for the fiscal year.

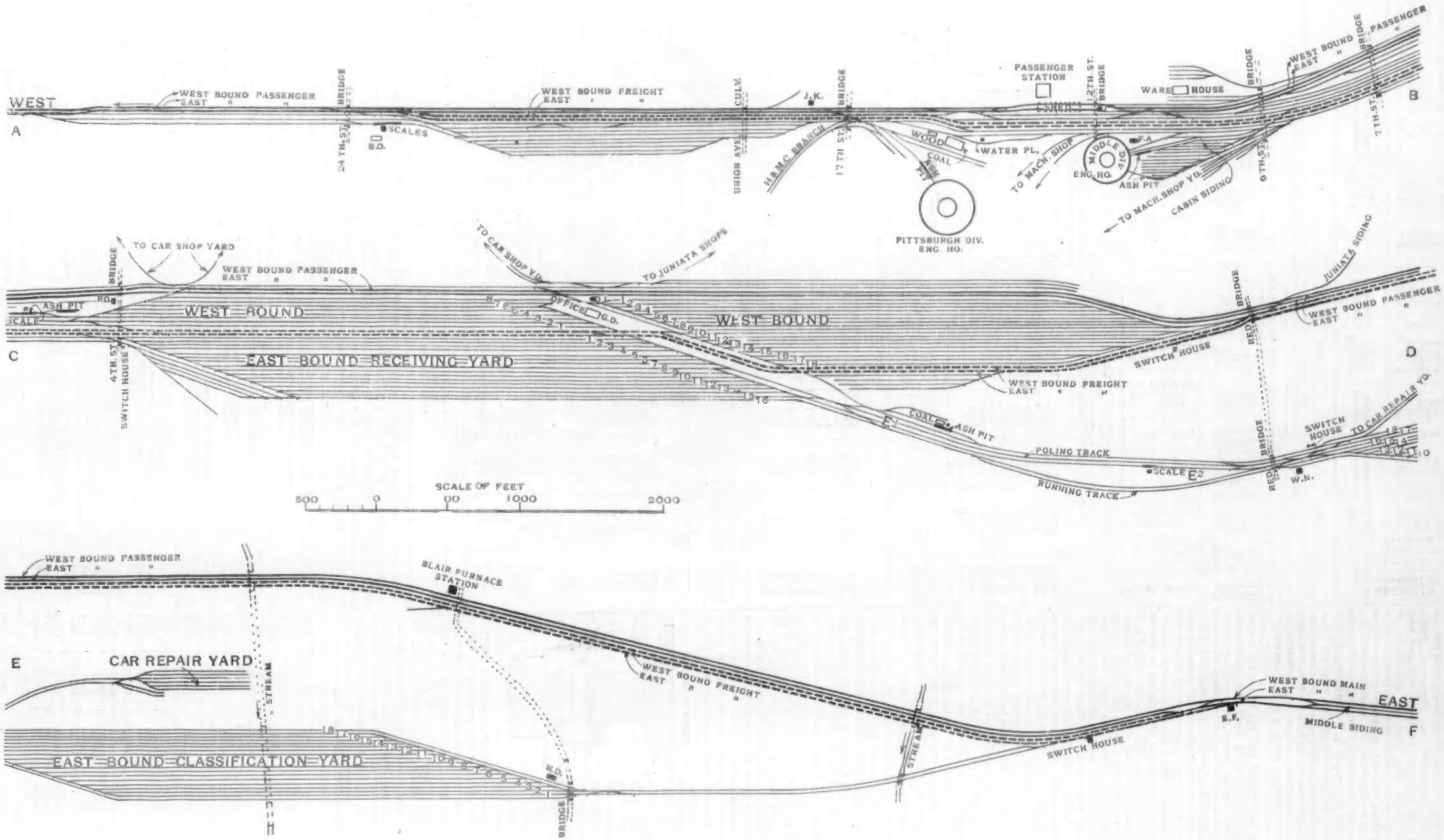
	Miles.
Length of track laid up to Dec. 31, 1891	170,601.18
Of which were completed up to the close of the fiscal years of the respective companies	167,909.07
Completed since close of their fiscal years	2,692.11
Net increase of mileage of all railroads in the United States in the Calendar year 1891	3,898.49
Net increase of mileage of railroads reported in the fiscal year 1891	4,488.73

Full statistics of operations were received from companies operating 164,261.91 miles.

Statistics of Operations, Fiscal Year 1891.

Miles of railroad operated (*exclusive of elevated railroads*) 164,261.91

Passenger train mileage	320,712,013	Passengers carried	556,015,802
Freight train mileage	493,541,969	Passengers—mileage	18,316,925,239
Mixed train mileage	16,948,394	Tons freight moved	704,398,609
Total revenue train mileage	831,202,376	Tons freight moved one mile	81,210,154,523
EARNINGS:		PAYMENTS from available revenue:	
Passengers	$290,779,696	Int'st on bonds	$225,339,413
Freight	754,185,910	Other interest	5,929,397
Other	80,549,209	Dividends	90,719,757
Elevated railroads	12,489,644	Rentals, tolls, etc	84,256,732
		Miscellaneous	31,013,045
Total traffic revenue	$1,138,024,459	Total	$417,253,344
Operating expenses	781,796,576	BALANCE:	
		Excess of available revenue over actual payments therefrom for the year	$40,250,722
Net earnings	$356,227,883		
Other receipts, including rentals received by lessor companies	101,276,183		
Total available revenue	$457,504,066		



ALTOONA FREIGHT YARDS, PENNSYLVANIA RAILROAD.

Each track is represented by a single line and the main freight tracks by broken lines. The section of the drawing marked B connects with C, and D with E. The grade (descending eastward) is nearly uniform throughout at 32 ft. to the mile.

The gross and net earnings, interest and dividend payments, etc., of the elevated railroads in the State of New York are included in the above table.

STATISTICAL STATEMENT FOR THE SURFACE STEAM RAILROADS.

	1891.	1890.
	Miles.	Miles.
Mileage of railroads	167.845.56	163,358.90
Second track, sidings, etc	46,683.39	44,792.99
Total track	214,528.95	208,151.89
Steel rails in track	174,775.14	167,457.58
Iron rails in track	39,753.81	40,694.31
	No.	No.
Locomotive engines	33,563	31,812
Cars—Passenger	23,083	21,664
Baggage, Mail, etc	7,368	7,253
Freight	1,110,286	1,061,952
Total revenue cars	1,140,737	1,090,869
Liabilities.		
Capital stock	$4,751,750,498	$4,590,171,561
Bonded debt	5,178,821,589	5,053,319,960
Unfunded debt	345,102,632	375,281,271
Current accounts	374,051,161	269,914,696
Total liabilities	$10,649,726,280	$10,288,687,518
Assets.		
Cost of R. R. and equipments	$8,927,571,592	$8,710,300,302
Real estate, stocks, bonds and other investments	1,588,590,522	1,458,599,089
Other assets	233,862,243	223,202,519
Current accounts	241,399,182	198,503,733
Total assets	$10,991,423,539	$10,590 605,643
	Miles.	Miles.
Miles operated	164,261.91	157,976.46
Rev. Train Mileage:		
Passenger	320,712,013	297,244,707
Freight	493,541,969	482,900,422
Mixed	16,948,394	13,780,016
Total	831,202,376	793,925,145
Passengers carried	556,015,802	520,439,082
Passenger mileage	13,316,925,239	12.521,565,649
Tons of freight moved	704,398,600	691,344,437
Freight mileage	81,210,154,523	79,192,985,125
Traffic earnings—Passenger	$290,790 696	$272,320,961
Freight	754,185,910	734,821,733
Miscellaneous	80,549,709	71,692.645
Total	$1,125,534.815	$1,078,835,339
Net earnings	350,807,370	341,666,369
Receipts from other sources	101,139,823	108,046,387
Total available revenue	$451.947,193	$449,712,756
Payments.		
Rentals, tolls, etc	64,243,732	58,811,849
Interest on bonds	222,652,306	217,922.677
Other interest	5,917,593	6,575,543
Dividends on stock	89,099,757	83,575,705
Miscellaneous	31,008,271	34,738,102
Total payments	412,921,659	401,653,879
Balance, surplus, or deficit	S 39,025,534	S 48,058,878

	1891.	1890.	1889.	1888.	1887.	1886.	1885.
	$	$	$	$	$	$	$
Capital stock p. m. of completed road	28,641	28,333	28,095	28,768	28,321	29,935	29,867
Bonded debt p. m. of completed road	31,179	31,244	30,178	29,572	29,290	28,062	29,453
"Cost of rd. and equip't" p. m. com. road	53,648	53,783	53.740	54,008	52,699	54,301	55,059
Pass. earn. per mile of road in operation	1,770	1,723	1 688	1,729	1,756	1,693	1,612
Fgt. earn. per mile of road in operation	4,591	4,651	4,333	4,307	4,649	4,397	4,219
Gross earn. per mile of road in operation	6,926	6,946	6,524	6,540	6,861	6,570	6,265
Net traffic earn. p. m. of road in operation	2,168	2,195	2,095	2,045	2,444	2,376	2,185
Percentage of expenses to earnings	68.83	68.33	67.95	68.72	64.45	63.84	65.12
Pass. earnings per pass. train mile	$ 0.907	$ 0.930	$ 0.932	$ 0.937	$ 1.008	$ 1.006	$ 0.949
Freight earnings per freight train mile	1.528	1.522	1.550	1.557	1.615	1.573	1.518
Gross earnings per revenue train mile	1.354	1.359	1.374	1.380	1.445	1.443	1.366
Gross expenses per revenue train mile	0.932	0.929	0.934	0.948	0.931	0.921	0.892
Net earnings per revenue train mile	0.422	0.434	0.440	0.432	0.514	0.522	0.474
Pass. earnings—proportion of gross	per cent. 25.84	per cent. 25.24	per cent. 26.13	per cent. 26.44	per cent. 25.82	per cent. 25.77	per cent. 26.25
Freight earnings—proportion of gross	67.00	68 12	67.13	67.24	68.38	66.94	67.90
Other earnings—proportion of gross	7.16	6.64	6.71	6.32	5.80	7.29	5.85
Earnings per passenger per mile	Cents. 2.184	Cents. 2.174	Cents. 2.169	Cents. 2.246	Cents. 2.276	Cents. 2.194	Cents. 2.198
Earnings per ton per mile	0.629	0.927	0.976	0.977	1.034	1.042	1.036
Average distance per passenger	Miles. 23.95	Miles. 24.05	Miles. 24.18	Miles. 24.79	Miles. 24.68	Miles. 25.27	Miles. 25.99
Average haul per ton	115.29	114.55	110.90	110.72	111.51	109.49	112.46
Interest per cent. of bonds	per cent. 4.25	per cent. 4.27	per cent. 4.40	per cent. 4 35	per cent. 4.71	per cent. 4.75	per cent. 4.77
Interest per cent. of bonds and debt	4.10	4.09	4.09	4.17	4.55	4.53	4.62
Dividends per cent. of stock	1.85	1.80	1.81	1.77	2.18	2.04	2.02
Int. and div. p. c. of stock, bonds and debt	3.08	3.04	3.03	3.03	3.40	3.26	3.36

A detailed table is given showing the ratio of railroad mileage to population and area, by states and groups of states. It gives one mile of railroad to 18.13 square miles of territory and one mile of railroad to 375.39 inhabitants, on Dec. 31, 1890, for the whole United States.

With the above comprehensive table of various data we close our extracts.

EARNINGS, DIVIDEND PAYMENTS, ETC., FOR 10 YEARS—STEAM SURFACE ROADS.

Year.	Earnings per mile. Gross.	Earnings per mile. Net.	Ratio, expenses to earnings.	Interest paid on bonded debt.	Dividends paid on share capital.
			p. c.	p. c.	p. c.
1882	$7,377	$2,670	63.61	....	2.91
1883	7,461	2,702	68.78	....	2.75
1884	6,663	2,318	65 21	4 66	2.48
1885	6,265	2,185	65.12	4.77	2.02
1886	6.570	2,376	63.84	4.75	2.04
1887	6.861	2,444	64.45	4.71	2.18
1888	6,540	2,045	68 72	4.35	1 77
1889	6,455	2,068	67.95	4.40	1.81
1890	6,929	2,162	68.33	4.27	1.80
1891	6,852	2,136	68.83	4.25	1.85

PASSENGER TRAFFIC FOR TEN YEARS, 1882-1891.

Years.	Miles in operation.	*Millions* of pass. train miles.	*Millions* of passengers.	*Million* passenger miles.	Earn'gs. *millions* of dollars.	Receipts per pass. per mile.	Rec. per pass.	Rec. per pass. train mile.	Av. rec. per mile of R. R.	Av. No. of pass. per mile of R. R.	Average train load—passengers.	Av. distance traveled per pass.
						Cents.	Cents.	Cents.	$	No.	Miles.	Miles.
1882	95,752	165	289	7,688	188	2.447	65.09	113.72	1,964	5,018	46.47	26.60
1883	106,938	188	313	8,541	207	2.422	66.14	110.07	1,934	2,923	45.45	27.31
1884	113,173	207	335	8,779	207	2.356	61.87	100.13	1,827	2,956	42.50	26.24
1885	122,110	212	351	9,134	201	2.198	57.16	94.94	1,645	2,877	43.16	25.99
1886	125,146	211	382	9,660	212	2.194	55.43	100.61	1,693	3,064	45.85	25.27
1887	136,986	239	428	10,570	241	2.276	56.17	100.75	1,756	3,126	44.27	24.68
1888	145,341	"68	451	11,191	251	2.246	55.68	93.74	1,729	3,105	41.73	24.79
1889	153,689	280	496	11,965	259	2.169	52.44	92.96	1,688	3,219	42.87	24.18
1890	157,976	297	520	12,521	272	2 174	52.13	91.61	1,724	3,294	42.12	24.05
1891	164,262	321	556	13,317	291	2.184	52.30	90.67	1,770	3,385	41.52	23.95

FREIGHT TRAFFIC FOR TEN YEARS, 1882-1891.

Years.	Length in operation, miles.	*Millions* of fr'ght train miles.	*Millions* of tons.	*Millions* of ton-miles.	Earn'gs. *millions* of dollars.	Receipts per ton per mile.	Rec. per ton.	Rec. per freight train mile.	Rec. per mile of railroad.	Av. No. of tons p. mile of railroad.	Average train load—tons.	Average haul per ton.
						Cents.	Cents.	Cents.	$	Tons.	Miles.	Miles.
1882	95,752	305	360	39,302	486	1.236	134 75	159.21	5,074	3,764	128.81	109.02
1883	106,938	350	400	44,065	539	1.224	134.72	154.09	5,045	3,744	125.86	110 04
1884	113,172	385	399	44,725	503	1.125	126.00	150.19	4,443	3,526	133.58	112.07
1885	122,110	342	437	49,152	510	1 036	116.62	148.91	4,174	3,378	143.59	112.46
1886	125,146	340	482	52,802	550	1.042	112.05	157.34	4,397	3,853	150.99	109.49
1887	136,986	394	552	61,561	637	1.034	115.32	161.51	4,647	4,090	156.16	111.51
1888	145,341	411	591	65,423	639	0.977	108.18	155.71	4,398	4,005	159 36	110.72
1889	153,689	429	619	68,677	666	0.970	107.55	155.06	4,333	4,029	159.91	110.90
1890	157,976	483	661	79,193	735	0.927	103.28	152.17	4 651	4,376	163.90	114.55
1891	164,262	493	704	81,210	754	0.929	1.7.67	152 81	4,591	4,288	164.55	115.29

TRAFFIC FOR VARIOUS PERIODS, AND VARIOUS GROUPS, OF LEADING RAILROADS.—PASSENGER.

	1870. Miles.	1870. *Millions* of passengers.	1870. *Millions* of passenger miles.	1870. Rates—cents.	1880. Miles.	1880. *Millions* of passengers.	1880. *Millions* of passenger miles.	1880. Rate—cents.	1890. Miles.	1890. *Millions* of passengers.	1890. *Millions* of passenger miles.	1890. Rates—cents.
Lines east of Chicago	4,400.65	24.2	1,050.8	2.38	5,867.57	35.1	146.8	2.24	9,400 53	100.1	2,423.3	2.04
West and Northwest lines	3,477.35	5.2	261.6	3.52	11,429.44	11.3	526.8	2.75	17,631.79	37.5	1,177.4	2.27
Southwestern lines	2,929.00	2.5	121.8	4 58	5,042.67	4.0	260.5	2.80	11,112.74	11.2	761.9	2.29
Southern lines	2,610.04	2.9	141.0	3.62	4,168.56	5.4	233.3	2.16	11,35 .11	21.5	872.4	3.30
Transcontinental lines	2,081.18	0.3	156.8	5.00	5,009.92	1.9	342.4	3.61	13,974.88	12.5	1,186.2	2 33
Totals	15,501.22	35.0	1,732.3	3.05	31,518.16	58.4	2,509.9	2.58	63,477.05	183.0	6,421.4	2.19

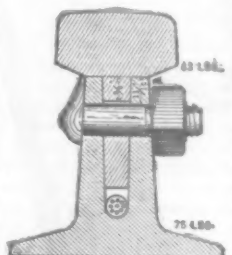
TRAFFIC FOR VARIOUS PERIODS, AND VARIOUS GROUPS, OF LEADING ROADS.—FREIGHT.

	1870. *Millions* of tons.	1870. *Millions* of ton miles.	1870. Rate—cents.	1880. *Millions* of tons.	1880. *Millions* of ton miles.	1880. Rates—cents.	1890. *Millions* of tons.	1890. *Millions* of ton miles.	1890. Rate—cents.
Lines east of Chicago	21.1	3,759.9	1.61	53.9	10,313.0	0.87	137.3	18,612.1	0.63
West and Northwestern lines	5.7	830.2	2.61	20.5	3,586.7	1.44	44.4	8,015.4	1.00
Southwestern lines	3.1	395.9	2.95	9.2	1,592.1	1.65	23.1	4,938.0	1.11
Southern lines	3.5	465.0	2.39	8.3	1,362.3	1.16	38.8	5,767.9	0.80
Transcontinental lines	0.9	151.7	4.50	4.5	1,429.3	2.21	19.3	5,180.1	1.50
Total	35.5	5,602.9	1.99	96.7	18,283.7	1.17	262.9	42,513.7	0.91

The Bargion Compound Rail.

The small engraving illustrates a design for a compound rail which has been in experimental use for over two years on the Belt line of the Southern Pacific Railway in Oakland, Cal., and the reports that we have seen are very favorable as to its performance. It holds up the ends of the upper member well and needs little attention, and the anticipated wear between the two members, and consequent looseness and rattle, did not take place. It was laid on a 7° 30′ curve with success.

The design is so extremely simple that it hardly needs any explanation. The two parts of the rail will be laid to break joints, and it is expected that in consequence most of the rail joint difficulty will be done away with. It is expected, also, to roll the two parts of different qualities of steel, making the upper part hard for wear and the lower part softer and tougher to better resist breakage.



Other designs for compound rails have usually and perhaps always made the lower portion in two parts for convenience in rolling. In the Bargion rail the lower member is rolled open, in a star shape, until the last pass, which closes it.

It will be seen that the upper member is supported under the head, and that a space is left between the lower edge of its web and the bottom flange. It is suggested that in this space an electrical conductor can be laid for any purpose, but particularly as a means of detecting a broken rail. Various designs of this rail have been made for street service as well as for steam railroads. The Bargion is the first rail made where the head and bottom flange were rolled separately.

The Sykes Patents.

As we have unintentionally allowed the question of the ownership of the Sykes patents to again get into the columns of the *Railroad Gazette*, we publish below the full text of the decision of Judge Acheson, U. S. Circuit Court, Western District of Pennsylvania, rendered in the May Term of 1890, in the case of the Johnson Railroad Signal Co. *vs.* The Union Switch & Signal Co., *sur* motion for an injunction:

This case is now before the Court upon the motion of the Union Switch & Signal Co., the plaintiff in the cross-bill, for a preliminary injunction against the Johnson Railroad Signal Co., the defendant in the cross-bill.

This branch of the case turns upon the question of title. Both parties claim title to the Letters Patent involved in this controversy, under Frederick Cheeswright, assignee of William R. Sykes. By letter of attorney, dated Sept. 10, 1881, and executed under his hand and seal, Cheeswright appointed D. M. Yeomans his "sole agent" for the United States "for the purpose of working and developing the business of the said patents" therein, "for and in consideration of a payment well and truly to be made by the said D. M. Yeomans to me, the said Frederick Cheeswright, my heirs, executors, administrators and assigns as royalty, of four pounds per lever British money, for every lever fitted upon any railway in the United States to which Sykes' system of signaling may be attached or connected, with power for the said D. M. Yeomans to negotiate the sale of the said patent, upon terms to be agreed upon."

The Union Switch & Signal Company acquired its title by an instrument of writing dated March 21, 1882, and executed under seal by the said D. M. Yeomans, not in the name or as the act and deed of his principal, Cheeswright, but in his own name, and as his own act and deed, and signed with his own name without more. This paper, after reciting the letter of attorney from Cheesright of September 10, 1881, proceeds thus: "Now in carrying out and accomplishing the purposes of the said agency, the said D. M. Yeomans, for and in consideration of one dollar to him in hand paid and of royalties to be paid as hereinafter set forth, has given and granted, and does give and grant, to the said the Union Switch & Signal Company, its successors and assigns, the sole and exclusive right and license under said recited patents, to make, use and sell the improvements therein described and claimed, or intended to be, to the full ends of the respective

terms of said patents, provided that and by the acceptance thereof the said licensee agrees that he will well and truly pay to the said Yeomans quarterly during said respective terms, and to his heirs, executors and assigns as royalty four pounds per lever, British money, for every lever fitted by it upon any railway in the United States, to which Sykes' system of signaling may be attached. Witness the hand and seal of the said D. M. Yeomans."

The title of the Johnson Railroad Signal Company was acquired under a power of attorney from Cheeswright to Henry Bezer, dated Oct. 31, 1889, and an absolute assignment of the Letters Patent in due form, dated Dec. 17, 1889, executed by Bezer as attorney in fact of Cheeswright.

Nothing appears on the face of the papers, or otherwise, to show that Cheeswright assented to or ratified the instrument of March 21, 1882, executed by Yeomans, or that he acquiesced therein after knowledge. Hence, the question of title, as it is now presented, depends altogether upon the papers themselves.

The title set up by the Union Switch & Signal Company is prior in date, but its validity is denied.

It is not to be doubted than an instrument of writing whereby the owner of a patent grants to a corporation, its successors and assigns, the sole and exclusive right and license to make, use and sell the patented invention during the term of the patent, passes the whole monopoly, and vests in the assignee the title to the patent. Nellis v. Penn Ins. Company, 13 Fed. R., 451. Pickart v. Packard, 22 Fed. R., 532.

It is in effect a sale of the entire patent. Now such was the character of the instrument which Yeomans executed to the Union Switch & Signal Company. Had he authority under his power of attorney to make an assignment? I think it clear that he had not. He was appointed the "sole agent" of Cheeswright in the United States "for the purpose of working and developing the business of said patents." Within what precise limits he was confined in executing the designated purpose we need not inquire now. Certain it is that the sale of the patents was not within the scope of the agency as thus declared, for we find that such a sale was expressly provided for in the subsequent clause, "with power for the said D. M. Yeomans to negotiate the sale of the said patents upon terms to be agreed upon." Indisputably, the power thus conferred upon Yeomans to negotiate a sale of the patents did not warrant an absolute sale by him without the concurrence of Cheeswright. Yeomans might negotiate the terms of a proposed sale, but no sale could be consummated until the terms were accepted by Cheeswright. But Cheeswright was not a party to the assignment of March 21, 1882, nor does it appear that he ever consented to the terms thereof. Therefore, as an attempted sale of the Letters Patent it was the unauthorized act of Yeomans and inoperative to pass title.

It is, indeed, earnestly contended that so long as Yeomans disposed of the letters patent upon the reserved royalty specified he was at liberty to act as he did, and that the consent of Cheeswright was necessary only in the event of a transfer of the letters patent for a gross sum. But the intention to make such distinction is not expressed in the power of attorney, nor inferable from the language used. Whatever the terms of sale might be, the consent thereto of Cheeswright was essential to validate the transfer.

As this conclusion is fatal to the present motion, I refrain from any further expression of opinion. Whether the instrument of March 21, 1882, is available to the Union Switch and Signal Co. for any purpose ought not to be considered until the final hearing of the whole case. The motion for an injunction is denied.

Driving the Last Spike on the First Pacific Railroads.

In the August issue of *Scribner's Magazine* appears an article by the late Sidney Dillon describing the driving of the last spike on the Union and the Central Pacific railroads. The whole article is of much historical value, and for that reason we publish what we estimate to be the most important portions of it, together with the illustration which accompanies it. The extensive circulation of the Magazine makes it probable that many, if not most of our readers, will already have seen the article there before they see it in these pages; still, we publish it in spite of that, as something that should go on record in the files of the *Railroad Gazette*. The discriminating reader will probably notice that one of the locomotives, the one on the right hand side, is a Rogers. It was one built by the Rogers Works for the Union Pacific Railroad in 1868. It had 16 in. × 22 in. cylinders; four 54-in. driving wheels, and four-wheeled truck; extended smokebox, Hudson's straight stack arranged for soft coal fuel. It had two pumps and one No. 4 injector; brass dome molding, and old style of sandbox with corrugated top. The firebox and flues were of iron. This was one of a great many engines built by the Rogers Works for the Union Pacific in and during the years 1865 to 1869.

The same reader would see, if he were discriminating enough, a member of the staff of the *Railroad Gazette* in the group on the left hand side of the picture; he is there, although the reader may not recognize him.

. . . It is not too much to say that the opening of the Pacific road, viewed simply in its relation to the spread of population, development of resources and actual advance of civilization, was an event to be ranked in far-reaching results with the landing of the Pilgrims, or perhaps the voyage of Columbus. . . . The five or six hundred men who saw the connection made at Promontory were strongly impressed with the conviction that the event was of historic importance; but, as I remember it now, we connected it rather with the notion of transcontinental communication and trade with China and Japan than with internal development, or what railroad men call local traffic. . . . The enormous development of local business has surpassed anything we could have ever dreamed of. Instead of being incidental and subordinate it is the chief business, the main dependence of the road, the through business for 1891 being only about five per cent. and the local ninety-five of the whole volume of traffic.

Nearly forty years earlier Asa Whitney, reading in China the account of the first experiment in railroad building in England, began to reflect upon the enormous changes the new invention made possible in bringing together remote sections of the globe; and naturally enough, his thoughts turned to the possibilities opened to Asiatic commerce. . . . He began his public work somewhere about 1841, and in 1845 secured a hearing before Congress. It was due almost entirely to his persistent efforts that the first appropriation for surveys was made in 1852. His proposition was to build a railroad from Lake Superior to Puget Sound, in consideration of a grant of land from the Government to a certain amount over the whole line. Experience has shown that his plan was far from feasible, but he clung to it with the faith of an enthusiast, keeping it before the people and before Congress until he had sacrificed his own private fortune and became discouraged. About the time the present charter was passed he disappeared from the scene. . . .

Politics, which has so much to do in preventing progress, took a turn in 1860, which resulted in the enterprise being put in practicable shape and hurried forward with unexampled speed to completion. The charter of 1862 was rushed through Congress because the war had disclosed the dangers of the existing situation. Our Pacific coast and the new states of California and Oregon were from twenty to twenty-four days out of reach, and only accessible then by transit through a foreign country. The coast was almost entirely undefended, and the Trent affair had awakened anxiety in the direction of a war with England, which the Confederate Admiral Semmes had intensified by the destruction of nearly a hundred whaling vessels in the Pacific Ocean. Even then the possibility of making the great intervening deserts habitable and populous and fruitful of profitable traffic, had not entered men's minds. Investigation showed that the transportation of mails, troops, munitions, and supplies, between the Missouri River and the Pacific Ocean was costing the Government upward of seven million dollars annually. It was estimated that the road could be built for one hundred million dollars. So that simply to do its own work the Government, had there been no constitutional hindrance, could well afford to issue its six per cents. for the amount, build the road, and save a million dollars annually on its own transportation.

The charter of 1862 was believed by Congress to contain sufficient inducements in its land grant and subsidy loan to enlist the capital requisite to begin the enterprise. No one had any idea that the full capital would be subscribed or paid in. That was plainly impossible. There were not many who believed the scheme was practicable. Most people looked upon the whole thing as visionary. Under the charter of 1862 nothing was done beyond effecting an organization. Capital held aloof from so unpromising a venture.

In 1864 the charter was amended, the land grant was doubled, and other changes made enlarging the inducements to capitalists to put enough money into the enterprise to give it a start. Even then the practical railroad builders, who were extending to and beyond the Mississippi the lines of what are now the great systems of that section, after thorough examination of the subject shrank from the undertaking. The Rock Island and the Northwestern were half-way across Iowa, but still a long distance from their objective point, the Missouri River. To one or the other of these roads it would fall naturally to take hold of the Union Pacific charter, and under it extend its own line beyond the river. The franchise was more valuable to them than to any one else. Both looked the matter over, considered the whole subject, and shook their heads. They saw no money in it.

With experienced railroad builders so advantageously situated, taking this view of the enterprise, the difficulty of procuring subscriptions and raising money to start the work may be easily imagined. Enough subscriptions were made, however, to justify a beginning, though it was quite evident that very few of the subscribers had any expectation of a return on the investment, either as interest or principal. The first installments on these subscriptions furnished about money enough to pay the costs of a celebration on the occasion of breaking ground at Omaha in the autumn of 1864. . . . Ground having been broken with proper ceremony everything stopped. Durant and Bushnell, who were the leading spirits in obtaining a charter and effecting an organization, were hard at work raising money and vainly trying to get *bona-fide* subscriptions enough to warrant going ahead. The limitations of the charter were a fatal obstruction. It was only when these difficulties were surmounted by the device of a construction company that they began to see light.

This is not the place to treat of the operations of the Credit Mobilier. I have only to say, as its executive officer during the period of its activity, that in my judgment its methods were as legitimate and honorable as those of any corporation with which I have ever been connected; and without it the Pacific Railroad could not have been built. . . . The advances made by the Credit Mobilier enabled the railroad company to go ahead, but on account of differences arising from a change in the original location of the line from Omaha west, work was delayed, so that it was about the beginning of 1865 when construction may be said to have fairly begun. Some grading was done in the autumn of 1864, but the first rail was not laid till July, 1865. During 1865 we laid 40 miles of track, on the acceptance of which by the Government we received $640,000 in Government bonds—being $16,000 a mile—as a subsidy loan. The land grant was in addition to this, but was not available to meet current expenses. Our land grant bonds and first mortgages were practically unsalable, and could only be used as collateral for loans made through the means of the construction company.

This money was a great help to us, though it came far short of relieving the pecuniary embarrassments which constantly beset us. Everything was done at enormous cost. None of the Iowa roads had reached the river, consequently all our materials, machinery, fuel, provisions, men, everything in fact, had to go St. Louis and be transferred thence by boat to Omaha. The treeless plains furnished no ties, and were obliged to transport them from remote points at very great expense. Ties for a long distance cost us sometimes $2.50 a piece. The cost of labor and provisions was also greatly enhanced by the lack of direct communication with markets; and in the absence of wood or coal we were obliged to procure fuel from long distances at a frightful cost.

Affairs wore a very unpromising look at the close of 1865, and were not much better at the end of 1866, though we had laid 260 miles of track during the year. During 1867 we climbed to the summit of the Rocky Mountains, and added 240 miles of track, making about 540 miles of completed road beyond the Missouri River. At the end of that year we were over the top of the mountains and nearly half way to Salt Lake City. The cost of building over the mountains was so much less than we had expected that the construction company found itself with a surplus from the proceeds of the subsidy bonds. This was imprudently distributed in dividends, so that in a short time we were in greater distress than ever for money. To add to our embarrassments the fact that we had reached the dividend point brought the harpies down on us from outside, and led to dissensions among ourselves. Nothing but the faith and pluck of the Ameses, fortified with their extensive credit, and the active financial aid of men like John I. Blair and other capitalists carried the thing through. Meantime the scene of active operation from the river to the mountains was attracting public interest and exciting public curiosity more and more every day. People who thought for a long time that the whole scheme was wild and visionary began after a while to realize that out there on the "Great American Desert," an extremely interesting enterprise was afoot, and that whatever came of it one thing was certain, the world had never seen railroad building on so grand a scale under such overpowering disadvantages and at such a rapid rate of progress.

The chief engineer of the work, a man whose animating spirit had much to do with the wonderful rapidity with which it was pushed, was General G. M. Dodge, who had explored the whole country from the Missouri River to Salt Lake as far back as 1853, when he was employed on the Rock Island road making surveys. He was an enthusiast who communicated enthusiasm to his working forces, and he showed skill in the management of hostile Indians, contractors, laborers, and the ruffians and gamblers who followed the camp. The close of the war, in which he distinguished himself, left him at liberty to accept this position of chief engineer, and his intimate relations with Grant and Sherman put him on such terms with commanding officers of garrisons and military posts along the route that he was enabled to avail himself of military aid against marauding Indians, and also frequently in maintaining order when worthless camp-followers became unruly. With him were General Jack Casement and his brother Dan, in charge of the tracklaying, men of boundless energy and undoubted courage, upon whom he could rely to carry out any order with military promptness and unquestioning obedience. The working force was almost entirely composed of discharged soldiers, whose experience during the war admirably fitted them to encounter the dangers from hostile Indians and endure the privations and hardships of camp life on the plains. At an alarm of Indians these men fell into line and prepared to meet the attack with the readiness and decision of veteran soldiers.

During 1868, and to May 10, 1869, we laid 555 miles of track, which took us to Promontory Point, just north of the shores of Salt Lake, where we met the track of the Central Pacific and made the connection between the two roads. For various reasons the two companies had not always worked together in perfect harmony, and one result of mutual misunderstanding was, that instead of making the connection when the working parties came together, the graders on both sides kept

Meeting of the Central and the Union Pacific.

Scene at Promontory Point, Utah, May 10, 1869—From the Only Existing Photograph.

right on until the two roadbeds lapped over 200 miles. When the tracklayers met the law required a junction to be made and this was done at Promontory. A controversy on the subject was subsequently settled by the Central Pacific leasing of the Union the track from Promontory to Ogden, which became the junction point. . . .

Arrangements were made at very short notice, and through the hearty co-operation of the telegraph companies all the principal officers in the country were informed a few hours beforehand that as soon as the preliminaries were completed a signal would be given and every office being put in connection with Promontory the blow of the hammer driving the last spike would be communicated by the click of the instrument at the same moment to every station reached by the wires.

General Dodge and the two Casements, and the force under them, were not idle during the night of May 9th and the early hours of the 10th. The rivalry between the two companies had been very sharp, and neither neglected an opportunity to gain an advantage. The tracks were only a few feet apart on the night of the 9th. During the evening General Dodge learned that the Central people had made their arrangements to put in sidings early next morning and secure possession of the terminus. But when in the gray of the morning the Central's construction train moved up they found, to their surprise, the sidings all laid and the rails occupied by the Union Pacific locomotives and cars. The Central people took it on the whole very good-naturedly, and did not permit it to disturb the general good feeling of the occasion.

It was not a large crowd. . . . A small excursion party, headed by Governor Stanford, had come from San Francisco; while on our side, besides our own men, there were only two or three persons present, among whom was the Rev. Dr. Todd, of Pittsfield, Mass.* Not more than 500 or 600, all told, comprised the whole gathering, nearly all of whom were officials of the two companies—contractors, surveyors and employés.

The point of junction was in a level circular valley, about three miles in diameter, surrounded by mountains. During all the morning hours the hurry and bustle and preparation went on. Two lengths of rails lay on the ground near the opening in the roadbed. At a little before eleven the Chinese laborers began leveling up the roadbed preparatory to placing the last ties in position. About a quarter past eleven the train from San Francisco, bringing Governor Stanford and party, arrived and was greeted with cheers. In the enthusiasm of the occasion there were cheers for everybody, from the President of the United States to the day laborers on the road.

The two engines moved nearer each other and the crowd gathered round the open space. Then all fell back a little so that the view should be unobstructed. Brief remarks were made by Governor Stanford on one side and General Dodge on the other. It was now about 12 o'clock, noon, local time, or about 2 p. m. in New York. The two Superintendents of Construction—S. B. Reed, of the Union Pacific, and S. W. Strawbridge of the Central—placed under the rails the last tie. It was of California laurel, highly polished, with a silver plate in the centre bearing the following inscription: "The last tie laid on the completion of the Pacific Railroad, May 10, 1869," with the names of the officers and directors of both companies.

Everything being then in readiness the word was given, and "hats off" went clicking over the wires to the waiting crowds at New York, Philadelphia, San Francisco, and all the principal cities. Prayer was offered by the venerable Rev. Dr. Todd, at the conclusion of which our operator tapped out: "We have got done praying; the spike is about to be presented," to which the response came back: "We understand. All are ready in the East." The gentlemen who had been commissioned to present the four spikes, two of gold and two of silver, from Montana, Idaho, California and Nevada, stepped forward, and with brief appropriate remarks discharged the duty assigned them.

Governor Stanford, standing on the north, and Dr. Durant on the south side of the track, received the spikes and put them in place. Our operator tapped out: "All ready now; the spike will soon be driven. The signal will be three dots for the commencement of the blows." An instant later the silver hammers came down, and at each stroke in all the offices from San Francisco to New York, and throughout the land, the hammer of the magnet struck the bell.

The signal "Done" was received at Washington at 2:47 p. m., which was about a quarter of 1 at Promontory. There was not much formality in the demonstration that followed, but the enthusiasm was genuine and unmistakable. The two engines moved up until they touched each other, and a bottle of champagne was poured on the last rail, after the manner of christening a ship at the launching.

The event was celebrated in all the large cities, and everywhere hailed with demonstrations of delight. In New York Trinity Church was thrown open at midday, an address was delivered by Rev. Dr. Vinton, and a large crowd united "to tender thanks to God for the completion of the greatest work ever undertaken by man." In Philadelphia bells were rung and cannon fired. At Chicago a great impromptu demonstration took place, in which all citizens joined. At Buffalo a large crowd gathered to hear the telegraph signals, sang the "Star-Spangled Banner," and listened to speeches from distinguished citizens; and at every important point the announcement of the completion of the work was received with unbounded joy.

That night our party started on their return, and the next day, May 11, 1869, trains began running regularly over the whole line. New York was in direct rail communication with San Francisco, and a new empire was thrown open in the heart of the continent.

Rescuing a Cargo of Steel Rails.

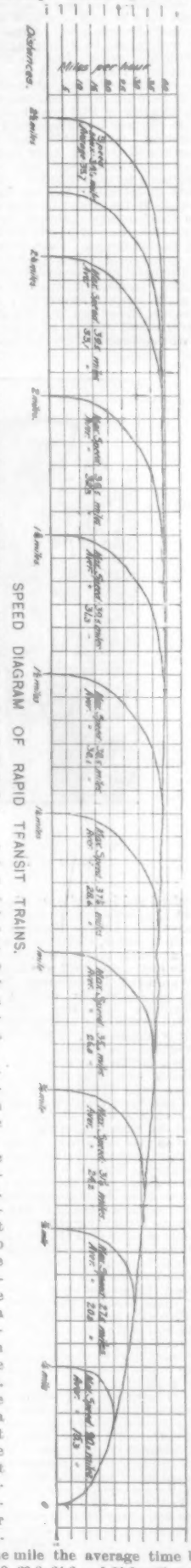
A successful effort is being made to secure 2,300 tons of steel rails, forming the cargo of the British ship "Abercorn," wrecked just north of Gray's Harbor, Portland, Or., three years ago. A wharf has been built out to the wreck, a distance of 1,500 ft., and the rails are hoisted out by engines and derricks. Four divers are employed in attaching the hoisting gear to the rails. Previous attempts have been unsuccessful. The present work is in charge of Paul Morton, C. E., of Seattle, Wash.

*Dr. John Todd's name will be familiar to most of our readers who have reached middle life. He was a Congregationalist minister of great local influence, and made considerable mark by his voluminous writings which passed many editions. The best known is probably "Truth Made Simple," in which appears the parable of "The Chance World," a devout but horrible extravaganza designed to convince the reader that the universe is controlled by a Supreme Intelligence. It has amused many little boys and scared many little girls, but we doubt if it has had much lasting effect on their belief.—EDITOR.

Rapid Transit Speed.

BY THEODORE COWPER, C. E.

The average speed of a certain motive power to haul a train between two fixed points is governed by the length of time necessary to get the train up to its maximum speed, the time during which the train is running at the maximum speed, and the time required to bring the train from full speed to a final stop. Assuming that the motive power is always capable of attaining the maximum speed in a fixed time, and that the brakes can always bring the train from its maximum to a full stop in another fixed time, the average speed will be governed, for stations at different distances apart, by the relation of the time during which the train is traveling at its full speed to the time required for the acceleration and retardation of the train.



In suburban or rapid transit traffic, where stations must be located at comparatively short intervals, the distance traveled by the maximum speed becomes very small; or the intervals may be so short that the motor never can attain its highest speed. The accompanying diagram is compiled from a continuous diagram taken by Mr. D. L. Barnes from an engine designed for use on the C. & S. S. Elevated R. R. of Chicago, making repeated stoppages at intervals varying from 0.18 to 2.37 miles.

The right hand portion of the diagram shows the increase of speed as the train gathers headway. The curve at the left hand represents the loss of speed as the trains are slowed by means of the brakes. The maximum speed, under the conditions of this test, is 39.5 miles per hour, and is only attained after a distance of about 1¾ miles.

While this diagram is taken from a steam locomotive, similar necessities of acceleration and retardation would give a similar diagram from any other kind of motor. The diagram has been arranged so that separate diagrams for this motor running between stations of varying distances can be seen at a glance.

The maximum and average speeds for these varying intervals have been computed and added to the diagram.

For description of the engine see *Railroad Gazette* for April 15, 1892. It has been designed especially for rapid transit service; in other words so that the trains can be gotten under way very rapidly, and also so that the train can be brought to a full stop in the shortest desirable time. The diagram only gives the average speed between stations. To determine the average speed over a route with a series of stations placed at fixed distances, it will be necessary to take account of the time required to discharge and take on passengers at each station. For runs of one-quarter, one-half, three-quarters and one mile the average time between stations will be 15.3, 20.8, 24.2 and 26.8 miles per hour. Allowing 12½ seconds for each stop, this being about the average upon the Manhattan Elevated Railroad, the average speed over a route having stations placed respectively at the above distances would be 12.6, 18.2, 21.8 and 24.5 miles per hour.

In providing for a scheme of suburban or rapid transit travel, the stations should be so placed as to give the greatest accommodation to the greatest number of people using the route. Time occupied in passing from any point of departure to the place of destination being the important factor, it becomes necessary to determine whether the stations should be placed at frequent intervals with the necessarily resultant slow average speed, or whether passengers should walk (those that can ride to stations being a small portion of the traveling public) a longer distance to reach the stations and then be transported at a higher average speed to their point of destination.

Study of existing suburban and rapid transit routes would indicate that the constant tendency is toward the increase rather than toward the decrease of the number of stations. In spite of the great desire for higher speeds upon our elevated railroads, there has been no popular demand for the removal of any of the existing stations. Yet the removal of every other station would render possible speeds more than 50 per cent. higher than can be attained with the present number of stations. There may be a reason for this. For the engine under consideration we have average speeds of 12.6 and 24.5 miles per hour over routes having respectively stations placed at one-quarter and one mile intervals; which is the more preferable arrangement, stations at one-quarter mile intervals and a resultant speed of 12.6 miles per hour, or stations at one-mile intervals and a speed nearly double the above? The average distance traveled by a passenger on the Manhattan Elevated Railroad does not exceed four miles, in the writer's opinion, and probably is nearer three. We will take the higher distance, or four miles, in our estimates.

Now to travel four miles at the two speeds of 12.6 and 24.5 miles per hour, requires respectively 19 and 9.8 minutes, showing a saving of time of 9.2 minutes by the higher speed. If therefore the passenger had no greater distance to walk in reaching the stations, the gain would be a very desirable one. But people's residences and places of business cannot all be clustered about stations one mile apart, as far as the island of Manhattan is concerned.

The mass of the traveling public must walk a far greater distance for stations one mile apart, than for stations ¼ mile apart, thus reducing the above apparent saving of time. The one-quarter near the station would be benefited, but the other three-quarters of the people would have an average walk of 1,300 ft. more for both the departing and arriving stations. The young and robust could cover this distance of 2,600 ft. in about 8 minutes, but the great majority would require from 10 to 12 minutes. Under these considerations there would be no saving of time for the greater number, by placing the stations one mile apart.

Of course it is clear that taking the average distance to be walked by the three-quarters furtherest from the stations does not give consideration to those who are only a small distance further than from the quarter-mile stations; neither does it give full weight to those who are one-half mile further away. But as the passenger who has the smallest or the longest distance to walk to the station may have, at the other end of his route, an increased or decreased walk, the average distance at each end of the route is more probably correct for a general consideration of the subject.

It may be objected to the above estimate that it applies only to the engine under consideration. It is well understood that the great advocates for express trains base their claims upon trains traveling 40 miles per hour, in comparison to the existing elevated railroad trains at about 12 miles. But an examination of our diagram shows that trains which only make 12.6 miles per hour with stations one-quarter mile apart, cannot, with the same engine, be hauled faster than 24.5 miles per hour with stops at one mile intervals.

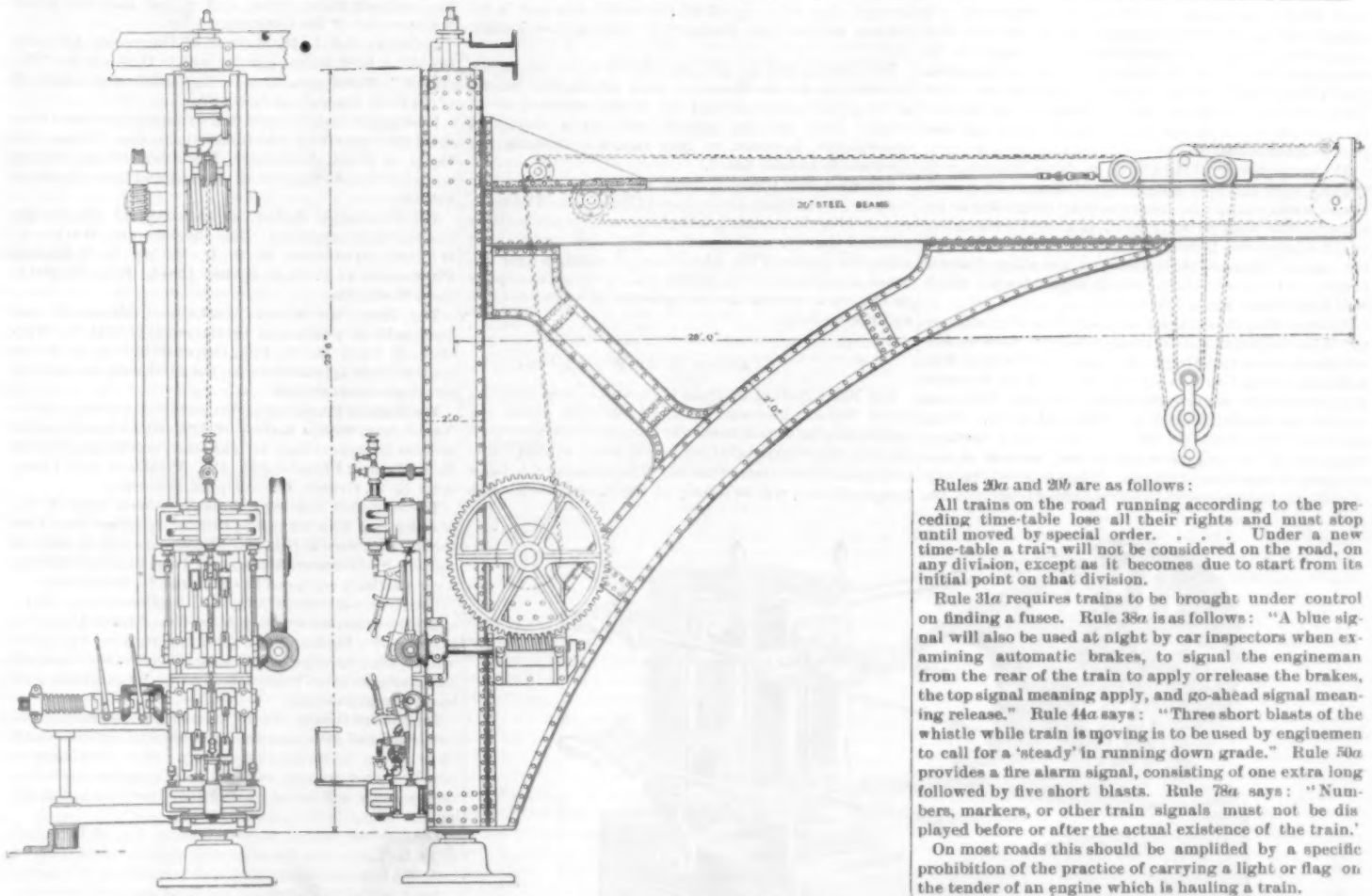
Any road which can support engines capable of making 40 miles over mile runs, would also use these same engines for the slower trains; and a fairness of comparison between different intervals for the stations requires that the comparison should be made upon similar motive powers.

We should then compare our 40-mile express speed with a probable 18 to 20 mile speed for the slower trains.

Upon this basis of comparative speeds, we find the saving in a four mile ride to be only six to seven minutes instead of nine, as before. So the higher our motive powers the less will be the saving in time and the shorter will be the distance which a passenger can afford to walk to give preference to the express service.

A mixed service of fast trains stopping only at the mile stations, and slower trains stopping at all stations, is considered as overcoming the difficulty of the longer walk, upon the assumptions that the transfers from a fast to a slow train and vice versa, take no time, and that the fast trains and slow trains always arrive at their common station together, the solution appears satisfactory. Such an ideal condition of train operation can hardly be conceived, and the loss of a few minutes at one or two transfers would render all the expected saving of time a disappointment. The express service will probably be entirely confined and operated in reference to the favored few whose travel lies between the express stations only.

Under the above considerations we should not estimate higher than 20 per cent. of the traveling public as likely to use the express service.



CRANES AT THE CLEVELAND CITY FORGE & IRON COMPANY'S WORKS.

Whether our proposed or future schemes of rapid transit should be handicapped by a largely increased cost of construction to give so small a portion of the people the increased facilities is worthy of very thoughtful consideration.

Cranes of the Cleveland City Forge & Iron Co.

The Cleveland City Forge & Iron Co. has at its shops two large 70-ton steam cranes, designed by Mr. F. Murgatroyd and built by the Chisholm Shovel Works, of Cleveland, O. A general view of one of these cranes is shown in the engraving. The boom is made of two 20-in., steel beams, and has a 28-ft. reach. The post and diagonal braces are made of iron plates reinforced by angle iron. The bearing at the base is a wrought iron pin set into a cast iron block, having a brass bearing plate. The foundations are of cribbed oak timbers, 2 ft. × 2 ft., drift bolted, set about 12 ft. deep. The heads of the cranes are attached to steel girders and are adjusted by means of large swivel braces. The diagonal bracing passes over wooden posts (not shown) and attached to the head of an iron pile projecting 2 ft. above the floor and which is backed by a nest of 8 or 10 wooden piles that are about 20 ft. long to floor level.

The power is supplied by two duplex reversing engines attached to the post. Those for the hoist have cylinders 9 in. × 9 in. The swinging and racking engine cylinders are 8 in. diameter by 6 in. stroke. Steam is conveyed to the engines by a simple form of steam connection at the head of crane and the pipes are brought down through the column of the crane.

All motions of the crane are performed by worm gearing. The large spur gear for hoisting is 5 ft. diameter with 2½ in. pitch. A 1½ in. chain is used for the hoist. The swing motion is obtained by means of a pinion engaging with a circular rack, of which the details are plainly shown and need no description. The details of the carriage and the means of moving it are seen by reference to the cut.

The Licking River Bridge.

The Coroner who investigated the causes of the fall of the false work of the bridge over the Licking River, which resulted in the death of 25 men, has rendered a verdict, the sum of which is that the accident is one which could not have been avoided by human foresight. The principal points in the verdict are as follows:

The Baird Bros. are in no manner to blame for the accident that befell them, which was purely accidental, and human forethought and prudence could not have prevented said accident.

The accident was caused, not by insufficient pile driving, defective timber, blocking, tackle, etc., or by defective false work, but was caused by the rails spreading suddenly near the pier on the Newport side underneath the traveler, throwing the leg on the northeast corner of said traveler from the track and precipitating said traveler, which at this time was supporting the north chord, weighing five tons, into the river, thereby dragging all other parts of the structure from the Newport toward the Covington side into the river.

This piling was pine and cypress principally, with some oak: was in good condition and ran from 35 to 58 ft., according to the depth of water in the river, and was braced on the double bents. The false work was well braced, and good timber used and well bolted together, and although some timber had been used previously, only that which was sound was used, and this it is customary to do in bridge building. The false work was held together at the top with bracing and stringers 8 × 16 in., which in turn supported ties 4 × 10 in., on which ran the rails that supported the traveler, and all were well bolted together with iron.

The piling was driven with an extraordinarily heavy hammer, weighing 4,200 lbs., and was dropped differently at different places, ranging from 3 ft. at starting of pile to 20 ft. after being partly driven, and the piles were driven 12 to 15 feet into the bed of the river. Unon examination these piles in many places were broken off four feet in the ground, and in other instances at surface of ground, and upon a test to remove one of the piles with 25 H. P. engine with double fall blocks, which increased power of said engine to 100 H. P., piling failed to be removed with engine carrying 95 lbs. of steam, and that trying to drive piling further into bed of river with above said hammer, dropping it several times on piling at heights of twenty feet, it failed to sink one-eighth of an inch lower.

The river at the time of pile-driving was about 30 ft. and very little current, and not at all unfavorable to the work. The traveler was built of good material and rails well put down, and the accident was unavoidable and prudence would not have prevented it.

This is all quite in accordance with the report published by us July 1, except that the theory of the spread of gauge under traveler was not then advanced.

The Standard Code on the Fitchburg.

The Fitchburg road, which lies in a part of the country supposed to be pervaded by a severely conservative, if not old fogyish, atmosphere, has issued a new code of rules for the transportation department. General Superintendent John Adams has been a member of the committee of the American Railway Association, and shows his appreciation of the work of that Association in this book by adhering very closely to the standard code.

On the Fitchburg the number of all trains is shown on the face of the headlight of the locomotive.

The rules between 121 and 500 are modeled quite closely after those of the Pennsylvania, which were described in the *Railroad Gazette* of Oct. 25, 1889. There are no rules for the block system, nor for several classes of higher employés, which receive attention in the Pennsylvania book, but a number of those which are used are made considerably fuller than those of the Pennsylvania. We note below the principal peculiarities that we have found which are different from those in other codes heretofore noticed in our columns.

Rule 11*b* forbids smoking "unless by express permission," a phrase which would seem to be well calculated to deter the employés from reporting one another for disobedience. Every man seen to smoke can be assumed to have received special permission.

Rules 20*a* and 20*b* are as follows:

All trains on the road running according to the preceding time-table lose all their rights and must stop until moved by special order. . . . Under a new time-table a train will not be considered on the road, on any division, except as it becomes due to start from its initial point on that division.

Rule 31*a* requires trains to be brought under control on finding a fusee. Rule 38*a* is as follows: "A blue signal will also be used at night by car inspectors when examining automatic brakes, to signal the engineman from the rear of the train to apply or release the brakes, the top signal meaning apply, and go-ahead signal meaning release." Rule 44*a* says: "Three short blasts of the whistle while train is moving is to be used by enginemen to call for a 'steady' in running down grade." Rule 50*a* provides a fire alarm signal, consisting of one extra long followed by five short blasts. Rule 78*a* says: "Numbers, markers, or other train signals must not be displayed before or after the actual existence of the train.'

On most roads this should be amplified by a specific prohibition of the practice of carrying a light or flag on the tender of an engine which is hauling a train.

Rule 117 is followed by three supplementary rules, which are better than the average. They require, among other things, that cars containing passengers shall not be moved or other cars set on to them except with an engine attached. Rule 121*a* requires a stop before all railroad crossings. As there must, we suppose, be some exceptions to this rule, it would seem that it ought to have been attached to rule 94.

Brakemen "must familiarize themselves with the company's rules, special instructions, train orders, etc., and assist the conductor in a strict observance of the same." Firemen have a similar rule. Conductors must see that a reliable brakeman reads and understands special orders, supplements or notices involving the safety of trains, and enginemen must do the same with the firemen. This rule, we believe, has been in force on the Fitchburg for several years.

One of the station agents' rules is:

"He must, so far as his other duties permit, know that the main track switches in sight of his station are kept right for the main track, and must be particular to note their position when he comes on and goes off duty; also after they have been used by trainmen or others."

Rule 51½ says that a fixed signal "should" be used at each train order office. Any operator may say R. D. for "red displayed." The normal position of the train order signal is white (safety).

The official diagrams for hand-motion signals and for flags and lamps on the front and rear of trains are printed in the back of the book.

It will be observed that we have noted but few infelicities of language, but these few are practically all that we have come across. In fact the chief merit of this work is found in the accuracy and brevity of the home-made portions of the rules, and readers who wish to get a good idea of it will, therefore, do well to secure a copy for themselves.

Car Repairs at the Buffalo Shops of the New York Central.

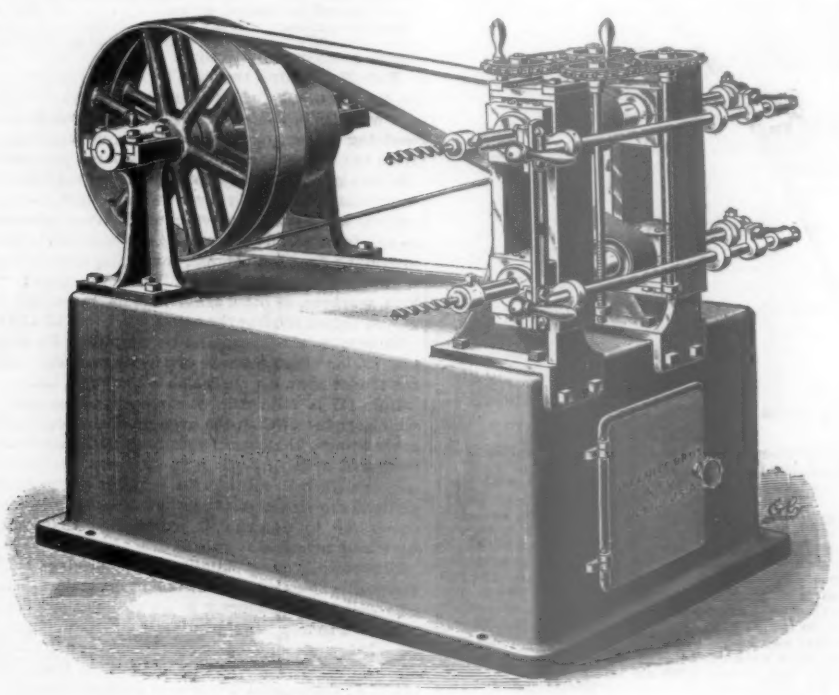
The methods followed at the Buffalo shops of the New York Central road are the result of continued effort and experiment in the direction of reducing to a minimum the labor on repairs in even the smallest particular. Without a most complete system, such as is used at this point, the work of repairing 22,000 cars a month (including light and heavy repairs) would be impossible at any reasonable figure.

As Buffalo is the western terminal for this road, the great variety and the large number of foreign cars necessitate carrying in stock many different patterns of oil boxes, brasses, centre plates and other castings used on the different foreign and private line cars. Patterns are kept for every casting that has ever been used for repairs, or is liable at any time to be needed. These patterns are numbered and stored in bins numbered to correspond, and either the pattern, or a casting therefrom, must always be left in the assigned place, as no vacant places are allowed, and a reference can be made to any particular piece whenever desired. The supply boxes of material, to which all the men have access, are

kept filled by men specially delegated to that work. A sample casting is nailed conspicuously in front of each box. All castings of a class are grouped together. In storing bolts those of the same diameter are grouped, the various lengths being placed in consecutive boxes. This method of allowing each workman to go directly for material which he may require saves much time and produces no confusion.

The arrangement of the tracks at these shops is such that all work enters at one side of the shop, and is passed through and out at the opposite side completed or repaired. The work is so graded that cars needing but slight repairs are repaired on the outdoor tracks, and only those which are badly damaged are allowed under cover. In the yards there are 17 repair tracks which will hold 15 cars each, 255 in all.

Between the tracks in the shop are elevated platforms about the height of the car roofs, which are used by the workmen when applying upper works and roofs. The material is raised to this level by means of an elevator placed near the woodworking department. This material is temporarily stored in the second story. From here it is swung out over the cars on a small carriage hung from a trolley and moved to any portion of the building by a system of tracks. When a great variety of roofs are to be repaired this arrangement permits assembling the necessary material very quickly, at the same time keeping the space between the cars clear at all times.



A 2-Spindle Boring Machine.

Two-Spindle Horizontal Boring Machine.

This new machine was originally designed for the Madison Car Co., Madison, Ill., by Greenlee Bros. & Co. Chicago. It is now in use by them, placed back of the long traveling bed of one of their upright, hollow-chisel mortising machines. This table feeds by power or by hand, and works to stops.

The boring machine is designed for boring the two holes for each stake in the side-plank of gondola cars. The spindles can be adjusted from 4 in. to 10 in. apart, and the machine can be set so that the holes will stagger, if desired. The depth of stroke is regulated by stops, and one of the handles on the boring spindle will operate both spindles, if desired. All the work is done to stops, so that no laying out is required. This machine is also useful for a similar class of boring on sills, top-plates, etc. The manufacturers will give further information if desired.

Another Electric Headlight.

The Mobile & Ohio has for a year past been trying an electric headlight on the St. Louis Division of that road, and it has given entire satisfaction. This headlight is known as the Gaston, and the patent is owned and controlled by the Gaston Electric Manufacturing Co., of Sparta, Ill.

It is claimed that the headlight in question has several advantages over other electric headlights that have been designed. In other electric headlights, the carbons are perpendicular, while they are horizontal in the Gaston light. The advantage of this is that the jar of the engine does not cause the carbons to pass each other, as is said to be the case with perpendicular carbons, giving a steadier light and lessening the chances of the light being put out by the carbons passing each other.

Another advantage of this light is that the lamp may be placed in the present headlights by simply removing the oil lamps and turning the reflector one-quarter around, thus utilizing all of the headlights now in existence without the necessity of making new casings, etc.

The engine and dynamo are placed in the cab of the locomotive, on the fireman's side, where they can receive proper attention and be closely watched at all times. They are only placed there as a matter of convenience, however, as they can, if desired, be put upon the headlight board.

The road has three of these headlights in operation now and is building three more at its shops. The experience with the electric headlight is that it is particularly adapted for use on engines pulling fast trains, as it gives the engineer the advantage of seeing a long distance at night, and also enables him to recognize objects on the track as well as the position of switches as he approaches them.

Railroad at the World's Fair.

The Barre Sliding Railroad Company is now building in the Midway Plaisance a double track line about one mile in length. It commences at Cottage Grove avenue on the west and runs parallel to Sixtieth street to the Illinois Central Sixtieth street Station. The structure being a temporary one, will be mostly of wood, and about one-half of it is now erected. This experimental road will cost about $250,000 to complete. The rails will be made of 9 in. × 5 in. channel iron. The whole upper part of the structure will be covered with sheet lead, making it waterproof. This is to prevent any water due to leakage finding its way to the ground below. On the line there will be a gradient of 6 feet in 400 to demonstrate the adaptability of this system to general service.

The equipment will consist of 15 cars, English type, with sliding side doors, 170 accumulators from the Reter & Conley Co., of Pittsburgh, 1,500 h. p., Heine safety boilers, and a hydraulic pumping plant furnished by Wilson Snyder & Co., Pittsburgh, will supply the power. The National Tube Works will furnish the piping.

Three trains will be run, consisting of five cars each. It is expected that trains will use but one minute between stations. Each train can carry about 300 passengers per trip, and the management expects to be able to handle about 900 passengers every two minutes.

The company states that contracts have been made for building two miles of permanent road to run from Fort Lane to Wimbley Park, in connection with the Metropolitan of London. A representative of the London company is now in New York to make contracts for the hydraulic plant.

TECHNICAL.

Manufacturing and Business.

A charter for the Philadelphia Car Wheel Co. was granted in Pennsylvania last week. The capital stock is $85,000 and the company's office is at Philadelphia.

Work has commenced at Carlisle, Pa., on the new frog and switch works. The shops will be 30 × 100 ft., and will be so planned that the capacity can be doubled at any time.

The Shepard Bridge Works Co., of Havana, N.Y., will soon have its new shops in operation, employing about 100 men. The main building is 60 × 210 ft., and is equipped with improved machinery.

Robert R. Zell, Vice-President and General Manager of the Campbell & Zell Co., of Baltimore, bridge builders, has resigned those offices, and retired from the active management of the company.

J. Brady and J. H. Raynor, of Galveston, have invented a feed water purifier which they call the "Excelsior." The apparatus is being tested on an engine of of the Gulf, Colorado & Santa Fé.

Newspaper reports state that arrangements have been concluded by which the Indianapolis Car Works will locate at South Milwaukee, Wis., the citizens having agreed to donate 25 acres of ground and give a bonus of $100,000.

The Pittsburgh Rolled Car Axle Co., of Pittsburgh, has just been organized. The directors are: Watkin Y. Williams, Braddocks; H. M. D. McCue, R. S. Martin, Pittsburgh; J. T. Duff, Spruce Creek; John S. McIntosh, Walls, Pa.

The American Wheel Works at Indianapolis has been sold at public sale by the receiver to D. W. Winchell, of Terre Haute, Ind., the only bidder, at 80 per cent. of their appraised value, the purchase price approximating over $1,000,000.

The Markee Pressed Steel Co., recently incorporated in New Jersey, with a capital of $200,000, to manufacture articles in pressed steel for car construction, has elected R. T. Markee, Philadelphia, Pa., President and Treasurer; L. W. Gruber, Philadelphia, Secretary.

The Meneeley Bearing Company, of West Troy, N. Y., is equipping with its patent tubular bearings four cars for the Delaware & Hudson. These cars will be run on the belt line between Albany and Troy, in which service a car similarly equipped has been run for 20 months.

The Brown & Sharpe Mfg. Co., of Providence, R. I., announces that its works will be closed from Aug. 1 to 13, inclusive, for annual vacation and repairs. The office will be kept open as usual and all orders will be filled for machinery or tools described in its catalogue and usually kept in stock.

The Elmira Bridge Works now has a business of between 700 and 800 tons a month of finished material, and their output is increasing rapidly. New machinery is now being set up, and as soon as it is in full operation the company will be in an excellent position to handle rapidly a largely increased business.

The Central Bridge & Engineering Co., of Peterborough, Ont., has been incorporated with a capital stock of $200,000, to manufacture steel and iron bridges and structural work of all descriptions, steel railroad cars, etc. W. H. Law, heretofore the proprietor of the Central Bridge Works of Peterborough, is at the head of the new concern.

New Stations and Shops.

The contractors say that the extensive shops of the Norfolk & Western building at Lambert's Point, near Norfolk, Va., will be fully completed within five weeks. The machine shops are 80 × 100 ft., the repair shop 75 × 380 ft., and the dwellings for the workmen are being rapidly erected.

B. P. Smith is building a five-stall roundhouse at Rochester, N. Y., for the Lehigh Valley.

The Intercolonial Railroad is calling for tenders for the construction of a large freight shed on the wharf at Deep Water Terminus, St. John, N. B.

The Northern Pacific is receiving bids for a brick freight house, 60 × 360 ft., in dimension, at Spokane, Wash., and will let the contract in a few days.

Plans have been prepared by the Great Northern for a large two-story brick passenger station, with stone trimmings and a tower, at Spokane, Wash. Ground has been broken, and construction will begin in a few weeks.

The new passenger station to be built at Augusta, Ga., by the Union Depot & Terminal Co. will cost, it is estimated, $200,000. The station building will be 80 × 270 ft., built of brick and iron, and the iron trainshed will be 135 × 500 ft.

The Rio Grande Western, it is reported, has agreed to build new shops at Ogden, Utah. Condemnation proceeding to secure the land have been begun, and the company is expected to begin work very soon on shops which will employ 800 men.

Baldwin & Pennington, of Baltimore, have completed plans for a six-story passenger station to be built by the Baltimore & Ohio near the mouth of its Belt Line tunnel, Baltimore. Two stories of the building will be underground, and its dimensions are to be 100 × 200 × 200 ft. There will be a tower 140 ft. high and 28 ft. square.

The Lehigh Valley has just acquired about ten acres of land in the centre of the railroad district of Buffalo, N. Y., on the south side of the Hamburg Canal, east of Louisiana street, for additional freight terminal facilities. Present structures on the property will be removed, and freight houses built and yards laid out.

Iron and Steel.

The Nova Scotia Steel & Forge Co., New Glasgow, N. S., is building a large new machine shop and foundry.

The Allentown Rolling Mill, at Allentown, Pa., is to start next week.

The rolling mills of the Catasauqua Mfg. Co., at Catasauqua, Pa., have been started.

Most of the machinery for the plant of the Midland Steel Shops at Muncie, Ind., has been placed in position and the works will be started up in a few weeks with 150 men.

At a recent meeting of the stockholders of the Lehigh Iron Co., at Allentown, Pa., a proposition was made looking to the reorganization of the company on a basis

of $300,000 capital, the plant to be bonded for ten years at five per cent. interest, for $125,000.

The Pittsburgh Iron & Steel Engineering Co., Lewis Block, Pittsburgh, has received the contract for building the new Bessemer Steel Works, of the National Tube Works Co., at McKeesport, Pa.

The Southern Malleable Iron Co., Chattanooga, Tenn. will enlarge its plant by the addition of machinery to manufacture the Hinson coupler.

The Colorado Coal & Iron Co. has received an order for 5,000 tons of rails for the Santa Fe, Prescott & Phœnix road. The company now has sufficient orders booked to give 1,100 men steady employment until December.

The Indiana Iron Co., of Muncie, Ind., has awarded the contracts for the erection of new nut and bolt works. There will be three main buildings, each 25x50 ft., one to be built entirely of iron by the Indiana Bridge Works, and the other two of brick.

The Lloyd Booth Co., proprietors of the Falcon Foundry & Machine Works, at Youngstown, O., last week consigned five cars of rolling-mill machinery to the Corning Steel Co., at Hammond, Ind. Additional shipments of about 20 cars will follow.

The Rail Market.

Steel Rails.—The market is extremely dull and the Eastern mills report no orders, the quotations continuing at $30 at mill. The market at Chicago is unchanged; quotations, $31 to $32.50. The mills anticipate large orders in a few weeks.

Compound Locomotives.

Under the Lindner patents for compound locomotives there have been built up to date 335 engines. The list comprises 37 express engines, 21 passenger, 221 freight, 46 tank and 12 double bogie engines. The gauge varies from one metre to five feet, and the steam pressure from 170 to 213.3 per square inch. This is a good showing for the Lindner engine. Of these, one company has built as many as 153 engines.

Coosa Mountain Tunnel.

General Manager Wadley is reported as having said of the repair of this burned tunnel: "The rain has practically stopped the work, but I expect in 90 days to have a train run through from one end to the other. One of the chief hindrances to rapid progress is the gas which generates so rapidly from the mineral matter that the men cannot work for any length of time on the inside of the tunnel. We are obliged to relieve them every two hours, and the noxious vapors are seriously affecting their health. We are now sinking a shaft down through the mountain into the tunnel, and we expect in this way to establish a draft which will carry off the gases and make it possible to work full time."

The Otis Elevated Cable Road.

The Otis Elevated Inclined Cable Railroad, which is being built up the face of North Mountain in the Catskills, will probably be opened early in August. The length of the road is 7,000 ft., and it extends in a direct line from Palenville, N. Y., on the Catskill Mountain road to the Mountain House. A description of the road was published in our issue of Feb. 5. The track will have three rails, the gauge being 3 ft. A car will be attached to each end of the cable, one car ascending while the other descends. The cable to be used is 1¼ in. thick, and will sustain a weight of 64 tons, but the cable will not be subjected to a greater strain than 12 tons. The power is obtained from a steam engine placed on the top of a hill. The elevation between the two terminal points is 1,580 ft., and the grades of the road vary from 4 to 33⅓ per cent. The machinery was built by Otis Bros. & Co., of New York. Thomas A. Brown, Jr., 38 Park Row, New York, is Chief Engineer.

Car Inspection in Texas.

A convention of Master Mechanics, Master Car Builders and General Car Inspectors of the Texas roads was held at Galveston July 20 and 21. The object of the convention was to try to get some uniform system for inspecting and carding cars. Mr. Douglass, who introduced the subject, said that there was a good deal of confusion and consequent friction in practice, the inspection being too rigid on some lines and not rigid enough on others. A committee was appointed to make a report, which they did, and the report was adopted as follows:

The committee appointed to devise a uniform system of inspection and carding of cars upon the railroads of Texas and connecting lines recommend that car inspectors be instructed to receive all foreign cars having old defects which do not render them unsafe to run or unsafe for trainmen, on record of the condition of such cars, without cards, and that each company be responsible and card only for all new defects of foreign cars that may be brought about while the cars are on its line.

Inspectors are requested to dispense with the use of indelible pencils and instead use pen and ink in making out defective cards.

A copy of these resolutions shall be furnished to each representative of the railroads in Texas, and to each representative of railroads connecting with Texas lines.

Elevating the Pennsylvania Tracks in Elizabeth.

The Pennsylvania awarded a contract this week to commence work on the elevaton of its line through the City of Elizabeth, N. J. The first work to be done will be to raise the two south tracks up to the new grade on trestle work. Trains will be run over this trestle as soon as it is completed, while work is in progress on the other two tracks and the permanent bridges and embankments are being built.

Train Lighting.

An English technical journal says that a very great development in the lighting of railway carriages seems to have set in in England, in India, in the United States and in Australia. It has taken a great many years to accustom our railway directors to the fact that railway carriages can be lighted very much more perfectly by means of oil gas than with oil, at a very much lower cost, with very much lower maintenance charges, and with absolute freedom from the damage which frequently occurs as the result of the use of leaky oil lamps and of broken lamp globes. For some years the best lighted railway carriages were to be found on the German lines, but the system there adopted is now, with some improvement, rapidly extending in use all over the world. We learn, and those that travel on the Midland Railway will be glad to know it, that that enterprising company has just determined to have nearly 900 more of its carriages fitted with gas lighting apparatus and that for this purpose three more oil gas works are about to be constructed at Birmingham, Leeds, and elsewhere. The Great Indian Peninsula Railway has recently completed oil gas works, and gas-lighted trains are running on the Bombay & Poonah line. Oil gas works have been completed on the Bombay, Baroda & Central Indian Railway, and the first trains are running on that line. The East Indian Railway Company has ordered the construction of several oil gas works for Howrah, Allahabad and elsewhere, and trains are to be provided with gas fittings on this line, on the Madras Railway, and on the Southern Mahratta Railway. It will now be possible to run trains provided with gas light for three nights' consumption, or for the whole journey from Bombay to Calcutta. This great extension of the gas lighting of trains, all of which is on the Pintsch compressed oil gas system, would appear to show that experience with electric lighting for this purpose is not in its favor.

New Terminus of the Central of New Jersey at New York.

The Philadelphia & Reading has completed negotiations for a second terminal in New York City. It has arranged with the Baltimore & Ohio to run ferry boats from the Jersey City station to the Whitehall slips at the Battery, thus securing direct communication with all the elevated roads which terminate at that point, enabling passengers from any point in New York or Brooklyn to pass directly to the upper deck of the new double-deck ferry boats without going from under cover. The Maryland Steel Co., of Sparrow's Point, Md., is building two new ferry boats for the trading for this service. These boats will be of the double end screw pattern, with upper and lower deck passenger accommodations. Their principal dimensions will be: Length over all, 258 ft.; length over outer posts, 145 ft.; beam molded, 32 ft.; beam over guards, 54 ft.; depth, 14 ft. Each boat will have two compound engines with cylinders of 14 in. and 30 in. diameter and 22 in. stroke, and two straight through boilers 3 ft. diameter and 18 ft. long.

A Compound from the Cooke Locomotive Works.

The Cooke Locomotive Works have had a compound locomotive in experimental service on the Erie Railroad for some time. It has made some 10 round trips, on the two division, in freight and passenger service. It is of the 2-cylinder type, without an intercepting valve; the first admission of steam being controlled by an attachment to the throttle lever. The engine is a 10-wheeler with drivers 54¾ in. in diameter. The cylinders are 19 and 27×24 in. and the weight in working order is 128,050 lbs. This engine now goes to Chicago over the Pennsylvania lines, hauling a passenger train all the way. At Chicago it will be put into service for trial on the Illinois Central.

The New Cruiser Columbia.

Cruiser No. 12, previously nicknamed the "Pirate," was launched from Cramp's shipyard in Philadelphia on Tuesday of this week, and was christened the "Columbia," by Miss Edith Morton, the daughter of Vice-President Morton. The "Columbia" is considered the most powerful and destructive cruiser yet designed. The length is 412 ft., with a beam of 58 ft. and 22½ ft. draft, giving a displacement of 7,350 tons. The vessel will be equipped with three vertical, triple-expansion engines, aggregating 20,000 H. P., and each driving a separate screw. The sustained sea speed is to be 21 knots per hour, with a maximum speed of 22 knots. The armament will be composed of one 8-in. high powered rifle; two 6 in. and eight 4-in. rapid-firing guns; twenty small rapid-firing guns and six torpedo tubes. There will be a heavy protective deck, four inches thick on the slopes and two and one-half inches elsewhere, completely covering the vital parts. Steel plates, four inches and two inches thick, will protect the ship's sides, while the 3-in. and 6-in. guns are to be protected by heavy steel shields attached to the gun carriages.

Chignecto Ship Railroad.

The negotiations which have been carried on with several contractors are still pending. The lifting docks and basin at the Fort Lawrence end of the line are now clear of water, and pumping operation have been commenced at the Tidnish dock. The conditions of the works is very good, no damage having been caused to them during the winter months. The negotiation of a new contract to complete the undertaking, by Messrs. Easton & Anderson, of London, England, with Messrs. Dawson, Symmes & Ussher has failed, the parties failing to agree as to terms. The latter firm is now moving its tools, etc., from the works. Other contractors have, however, been on the scene. H. S. Holt, partner with James Ross, of Montreal, and W. J. Hogan, of the same place, have been over the line. Messrs. Connolly & Co., contractors of the Kingston dry dock, Mr. Rockfield, of Halifax, and Messrs. Rhodes, Curry & Co. are spoken of as probably to take part in the completion of the road. It is likely that Easton & Anderson, who already have the contract for the machinery, will take the place of Meiggs & Sons, as chief contractors and finish the road. Canadian contractors will probably combine with Messrs. Easton & Anderson to form a construction company.

The Keystone Metal and Vulcabeston Unions.

Stanley G. Flagg & Co., of Philadelphia, report an increasing demand for Keystone soft metal unions, and have considerably increased the capacity for manufacturing the unions. They are made under patents which also include the Keystone vulcabeston union. The vulcabeston packing is more desirable for high steam pressure, as contraction and expansion is less than the soft metal, and, being indestructible, is very valuable, especially in salt, soda, alkali, ammonia, and high steam pressure connections. Acid and gas have no effect on this packing, and it has the property of great heat resistance, making it essential in many cases, as it will not expand, shrink or warp. In the ordinary unions, where a packing has to be inserted, should the pipe be slightly out of line in making the connection, the packing wears thin on one side more than on the other, causing considerable inconvenience in making connections; with the Keystone unions, the head and tail pieces accommodate themselves to the line of the pipe, and a joint is made with but little pressure and very rapidly. These unions are furnished packed, ready for immediate use. The firm now manufactures them in large quantities, and is prepared to fill small orders.

Overhead Highway Bridges.

On the Fort Washington Branch of the Philadelphia Germantown & Chestnut Hill Railroad, now being built by the Pennsylvania, a new feature in the construction is the substitution of iron for the old standard wooden overhead highway bridges, which have heretofore been constructed upon branches of the Pennsylvania Railroad. This is a marked improvement and an advantage both to the railroad company and the traveling public, and it is understood that when the maintenance of the old wooden bridges is taken into consideration the more permanent iron structures are far cheaper in the end. These bridges are being constructed of plate girders in three bays, each spanning two tracks and supported on lattice posts thoroughly braced, and are surmounted by a neat railing, with sidewalks raised about 6 in. above the roadway. The masonry upon this line is of a high standard of excellence, being constructed for double track, of dimension stone of first class quality.

The Largest Freight Steamer Afloat.

The Bovic of the White Star Line, recently launched from the yard of Harland & Wolf, of Belfast, is claimed to be the largest freight steamer afloat. She has a length of 470 ft., 53 beam, 35.6 ft. depth of hold and a gross registered tonnage of about 6,000. She will have two sets of triple-expansion engines driving twin screws, and will be fitted to carry 1,050 cattle on her upper decks with special accommodations for horses amidship. It is the intention to place her on a regular weekly freight line to be established between New York and Liverpool. She is a "sister" to the "Naronic," just put in service by the same line.

The Master Mechanics' Association Scholarships.

One scholarship, for the four years' course, will be open for competition at the Stevens Institute of Technology next September. The requirements are that the applicants shall be sons of members of the American Railway Master Mechanics' Association in good standing, and they must have at least one year's experience in a machine shop. There will also be vacancies for scholars in the second and fourth year classes. Should no candidates pass for these, there will be two scholarships open in the Stevens Preparatory School for persons eligible for the association scholarships in the Stevens Institute of Technology.

The New Broad Street Station, Philadelphia.

The order for the iron work in the new addition to the Broad street station of the Pennsylvania in Philadelphia, described last week, has been given to the Pencoyd Iron Works, of Philadelphia. The order, it is stated, will require nearly 10,000 tons of iron work.

Drying Cars in the Paint Shop.

A new method of drying painted and varnished cars is referred to in the Austrian *Eisenbahn-Zeitung*, by W. Rayl, by whom its use was proposed to the Kaiser Ferdinand's Northern railroad, of Austria. The proposed new method consists in placing the car, after it has been varnished, in a small drying room just large enough to hold it. This drying room can be put up in the paint shop, and is to be built with light wooden walls.

On the inside of the two side-walls there is a network of steam pipes, and the steam used for heating is at a pressure of from 45 to 60 lbs., so that, in a comparatively short time, a temperature of about 150 deg. Fahr. can be secured in the room. After the application of each coat of paint or varnish, the car is left in this room for from 5 to 8 hours, with the result, it is claimed, of securing not only more rapid, but more thorough, drying than is possible in the ordinary way with atmospheric temperatures. Mr. Rayl's method has been in use at the car shops at Floridsdorf since May, 1889, and is said to have given most satisfactory results, showing, for example, that while the ordinary process of painting and varnishing a car consumed 200 hours, the drying room enabled the accomplishment of the same work in only 66 hours.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
Published Every Friday,
At 73 Broadway, New York.

The subscription price is $4.20 a year in North America, and $6.08 in foreign countries.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

In the past there has not been much complaint against the noise and smoke made by suburban locomotives in Chicago for the reason that the people did not know that something better could be had; but since attention has been called to the smoke nuisance by the formation of a society for the prevention of smoke, and since the trials of the compound locomotives of the Wootten type on the Illinois Central road and the use of the compounds on the elevated road, the residents, more particularly on the south and west sides, are beginning to grumble about the noise made by the ordinary engines. The difference is so marked that anyone can tell which is a compound and which is a simple engine. The pressure of the exhaust from the Illinois Central surburban engines, and that from the other suburban engines in the city varies from 60 to 70 pounds at starting down to 10 or 15 pounds after they are running. With the compound the maximum exhaust pressure is not over 20 pounds. The difference in the sound of the exhaust of the two engines, of course, results from the difference in the pressure of the exhaust, and as a rough approximation one might say that the disagreeableness of an exhaust varies about as the square of the pressure. Anyway, inhabitants living near stations on suburban lines are much annoyed, and have determined to see what can be done to reduce the annoyance. One surface road has taken the matter up, and the officers say that if there is no saving in the compound in the matter of fuel and expenses of operation they would feel amply repaid if compounding will reduce materially the disagreeable sound of the exhaust of their locomotives. When the "Alley" elevated was discussing the question of compounding, it was decided that if the engines were not more economical the reduction of the sound of the exhaust would be worth considerable of itself, and on that account mainly the decision was reached to compound all its locomotives; the engineers of the road having made a thorough examination of the compounds in use, reported that there was a decided decrease in the noise. At the present time the compounds on the elevated road in Chicago are running without a muffler and the sound of the exhaust, even when hauling six car trains, is less than the noise made by the Manhattan elevated engines with mufflers. This is a natural result, as on the one hand there is but little expansion at starting, and on the other hand there is so much expansion that the pressure of the exhaust is reduced to about 10 lbs. Just what the saving is that may result from compounding suburban engines is not known; but the double expansion engine will undoubtedly be of value in Chicago to reduce the noise of suburban engines, and if it does save fuel will assist in abating the smoke nuisance.

In our issue of July 15 the Midvale Steel Co. gave some important information about the breakage of locomotive driving tires, caused by allowing too much for shrinkage, and gave a useful table showing the proper allowance for shrinkage. Attention was called also to the need of a standard shrinkage, and the company advised the presentation of the subject to the next annual convention of the Master Mechanics' Association. Probably our correspondent overlooked the fact that in 1886 a report was made to the Association by a committee consisting of J. N. Lauder, Jacob Johann and H. N. Sprague. This committee recommended the adoption of standard sizes of wheel centres and a standard shrinkage of one one-hundreth of an inch per foot in diameter. In the following year these recommendations were adopted and the Pratt & Whitney Company, of Hartford, Conn., was requested to make standard gauges for sale to railroad companies. Since that time there has been a tendency on the part of the members of the Association to adopt these dimensions, and we know that, as a fact, most of the more careful railroad mechanics are making gauges copied from the standard gauges made by Pratt & Whitney. In the *Railroad Gazette*, Jan. 22, 1892, a correspondent gave some information showing how great is the strain in locomotive driving tires produced by shrinkage. An examination of the argument offered by our correspondent at that time will show how simple a matter it would be to cause a tire to burst by giving it too much shrinkage. Those who have shrunk tires on driving wheels made of different kinds of cast iron know that some wheel centres will stand much more shrinkage than others. With a very soft, open iron more than double the standard shrinkage can be allowed without causing an increase of the strain in the tire. To make a tire hold fast the centre should be of good, hard, wheel iron, and no more than the standard shrinkage should be allowed. As nearly all wheel centres are made of hard cast iron, there are but few cases where the shrinkage needs much more than the standard adopted by the Master Mechanics' Association. If anyone is using more than the standard shrinkage he is doing so because he does not understand the danger of it or because he is not using the proper material for wheel centres.

Railroads of the United States in 1891.

Poor's "Manual" will probably appear a little earlier this year than last. That is, advance sheets are now out, and the volume is promised by the end of this month, which will be a gain of a week or two. We fear, however, that it will not do to build up hopes of any great future gain in this particular, for the editor himself seems to be disappointed this year, and promises nothing for next. We understand very well that "in the nature of things" the preparation of this vast mass of statistics must be slow if it is to be at all accurate, but we still hope that the pressure of competition with the Interstate Commerce Commission's reports will change the nature of things a little. That hope is, however, not sanguine. The last statistical report of the Commission brings us down to June 30, 1890! So it is true that in this matter, as in most matters, the public is best served by private enterprise.

We print on another page certain of Poor's statistics which are of the most general interest. One naturally turns first to the figures of increase of mileage. Poor's figures, which are probably more accurate than any others now available, show a total of 170,601 miles of main line track Dec. 31, 1891. He gives the *net* increase for the year as 3,898 miles, and the construction as 4,471 miles. The difference, 573 miles, is accounted for by 195 miles abandoned, 131 miles changed from main track to sidings, and 247 miles "net miscellaneous decreases," due largely to more accurate reports. The net increase was the smallest for many years, both absolutely and in percentage. In fact, beginning with 1882 the increase, in percentages of track existing at the first of each year, has been, 1882, 10.8; 1883, 5.5; 1884, 3.1; 1885, 2.3; 1886, 5.9; 1887, 8.7; 1888, 4.4; 1889, 3.2; 1890, 3.3; 1891, 2.3. The increase in the 10 years, 1882-1891, was 65.5 per cent.

Those figures deal with what is supposed to be the total miles of main line track at the end of each year. But the figures of traffic handled and the results of operation are drawn from the mileage of railroad reporting to Poor. This is in each year less than the total at the end of the calendar year and also less than the total miles at the end of the companies' fiscal years. Thus the miles of railroad at the end of the fiscal years ending in 1891 were 167,909, but the miles from which statistics of operation are collected are 164,262.

Taking, therefore, this last class of figures, we find that the miles reporting operation increased 6,286 over 1890, or 3.98 per cent. The gross earnings increased $46,700,000, or 4.33 per cent., and the net $17,141,000, or 5.02 per cent. This is encouraging, especially when we remember that we are not yet dealing with the statistics of the greatest crop year that the country ever had. The average year in which the above results were got ended somewhere after June 30, but how long after the compiler of the Manual does not attempt to estimate. At any rate, the great crop movement came too late to affect very much the sum of the results gathered in this issue.

The ton-miles increased in 1891 2,017,000,000, or 2.8 per cent. over 1890, and the passenger-miles 795,000,000, or 6.4 per cent. The earnings per ton-mile increased from 0.927 to 0.929 cent, and per passenger-mile from 2.174 cents to 2.184 cents. The passenger journey decreased slightly, but the freight haul increased from 114.55 to 115.29 miles. This last seems to be increasing steadily, as may be seen from one of the tables which we print on another page; but the earnings per mile of road and per revenue train-mile do not change one way or the other by any settled or regular law. It is only by taking averages for long periods that one might perhaps establish something like a rate of change. Thus, we find by taking the five years 1882-1886 and the five years 1887-1891 that the gross earnings per mile of road were $6,867 in the first period and $6,707 in the second; the net were $2,451 and $2,171. While the gross fell off 2.4 per cent. the net declined 12.9 per cent. We see in the same periods a fall in rates, especially for freight, and an increase in the ratio of operating expenses to gross earnings. This ratio in 1891 was 68.83 per cent., notwithstanding the theory advanced by the "Manual" some three years ago, that "under reasonable conditions the existing railroad system of the United States could be operated at an average of 60 per cent. of its gross earnings. But we find that this percentage averaged 65.31 in the five years 1882-1886 and 67.66 in the five years 1887-1891. And this has gone on in the face of rigid and intelligent economics in operation. The column showing the average freight train-load in one of the tables which we reprint is proof of this. The load increased from 128.81 tons in 1882 to 163.99 in 1890 and 164.55 in 1891. The increase has been unbroken since 1883. We find therefore that from 1889 to 1890 the freight traffic (ton-miles) increased 15.3 per cent. and the freight train-miles 12.25 per cent. From 1890 to 1891 the increase in ton-miles was 2.6 per cent. and in train-miles 2.2 per cent.

Economies in the passenger business have probably not been so carefully studied, partly perhaps because the passenger earnings are but 38 or 39 per cent. of the freight earnings and partly because the rates are not declining so fast. For 10 years these rates have been, per passenger-mile and per ton-mile—in cents:

	Pass. rate.	Freight rate.
1882	2.447	1.236
1883	2.422	1.224
1884	2.356	1.125
1885	2.198	1.036
1886	2.194	1.042
1887	2.276	1.034
1888	2.246	0.977
1889	2.109	0.970
1890	2.174	0.927
1891	2.184	0.929

At any rate, whatever the reason, the passenger train-load declines while the freight train-load increases, and the passenger journey gets shorter while the freight haul gets longer. Last year both the passenger train-load and the journey were the smallest recorded. This is an evident result of the growth of suburban business; the number of short trips increases and so does the empty car mileage. It is curious to note, side by side, the rate of increase of passenger train-miles and passenger-miles and the decrease in train-loads and length of journey, for several years:

	Per cent. of increase of train-miles.	Per cent. of increase of passenger-miles.	Passengers per train.	Journey, miles.
1883	13.9	11.1	45.15	27.31
1884	10.1	2.8	42.50	26.24
1885	2.4	4.1	43.16	25.99
1886	0.4 (Dec.)	5.7	45.85	25.27
1887	13.3	9.4	44.27	24.68
1888	12.6	5.9	41.73	24.79
1889	4.1	6.9	42.87	24.18
1890	6.5	4.6	42.12	24.05
1891	7.8	6.4	41.52	23.95

In this table the relations between train-loads, train movement, and passenger movement are fairly well shown. If, as is tolerably certain, the unfavorable course of the passenger business is due to the increase in suburban traffic it is apparently, rather than really, unfavorable. The development of suburban travel is to a great degree a better utilization of facilities which already exist. It is not all clear gain and must be done at low rates, but there are large elements in fixed charges and in operating expenses which it does not increase at all.

Some Probable Causes of the Failure of Staybolts.

There has been lately considerable discussion of the causes of broken staybolts, and a correspondent of the *Railroad Gazette* pointed out, June 17, the need for larger staybolts for the thicker sheets. Besides the use of small staybolts, there are other causes which tend to increase and induce breakages.

The taps and dies used for cutting the threads on the staybolts and tapping out the sheets are not made with the care that is necessary. As long as staybolts are tight when screwed in boiler makers are satisfied. But a tight staybolt is not necessarily a good staybolt; and because a staybolt does not leak there is no surety that it has been well put in. It has been noticed by some who have watched carefully the action of staybolts that loose bolts stand better than tight ones, and a few of the more careful boiler makers have specified the length of the wrench to be used in screwing in staybolts, hoping thus to obtain a reasonable uniformity in the tightness in the sheet.

The very worst form of thread that can be used for staybolts is a sharp V-thread, such as is shown in fig. 1. In a case of this kind, if the staybolt is a little larger than the sheet, an indentation is made at the bottom of the thread *A*, figs. 1 and 2, in the soft staybolt by the action of the harder sheet, which has exactly the same effect as a V "jam" die. This indentation is exactly the same kind that one would make in a piece of iron if he wished to break it easily and quickly. The

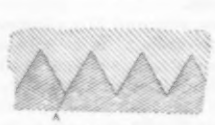


Fig. 1.

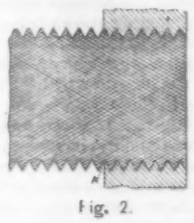


Fig. 2.

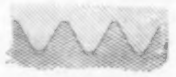


Fig. 5.

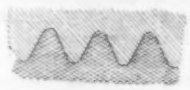


Fig. 3.

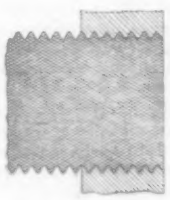


Fig. 6.

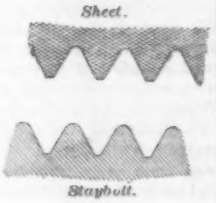


Fig. 4.

staybolt is soft; the sheet is hard. The sharp V-thread cuts into the bolt and gives a set of conditions which induce the formation of cracks and lead to breakages. A better form than this is the Whitworth thread, shown in fig. 3, where the tops and bottoms of the thread are not sharp, but rounded. In this case, however, the amount of rounding is so small as to give a result of the same kind as in fig. 1, but less in degree. The United States standard thread has a flat top and bottom. This is open to the same objection as the Whitworth, shown in fig. 3, and perhaps is even worse in its results where the hole in the sheet is somewhat smaller than the diameter of the staybolt.

It will be seen that if a stay bolt is loose no indentation is made, and there is not the same liability to cracking; but from the fact that the thread on the stay bolt has a sharp bottom, there exists a condition of concentration of strain which will assist in starting cracks.

Loose staybolts are not desirable; they should fit the sheets tightly enough not to leak before they are riveted over. It is not safe to depend upon the riveting alone for a tight fit. To meet this condition, an arrangement of threads, shown in figs. 4, 5 and 6, might be used, and tests are now being made to determine whether a staybolt fitted in this way will stand more vibration before breaking than one fitted as in fig. 1. The method of making taps and dies for staybolts of this kind is simple. It consists in rounding off the tops of the threads in the sheet, as shown in fig. 4, with a larger radius than is given to the bottoms of the threads in the staybolt, and when fitted together there is a small space between the top of the thread in the sheet and the bottom of the thread in the staybolt, as shown in fig. 5. This prevents any indentation of the staybolt end and any "jam" die action of the thread in the sheet. The joint in this case is made wholly on top of the threads on the stay bolts, and those who have examined this proposed form of thread and arrangement for clearance at the bottom of the staybolt threads believe it will reduce staybolt breakages. This is a proposition that seems worth trying, and perhaps, taken together with an increased diameter of bolt, may give a stay bolt arrangement that will be reliable.

It is argued, and with some reason, that if steel staybolts were put in as shown in figs. 5 and 6 they would give good results; and that the reason why they have failed in the past is because when there is an indentation or sharp angle, as shown in fig. 1, steel is less reliable than iron. On the other hand, when there is no concentration of bending action, steel stands better than iron. This is, perhaps, shown clearly from the results of testing staybolt material in a vise with a wrench or a piece of pipe. Under such conditions steel rods of the same diameter as iron rods stand many more repeated bendings than iron.

Some Ethical Points of Discipline.

We have said that railroad discipline can be improved if railroad managers set about it. Railroad men can find an example worth imitating right under their noses—that is, in the postal cars on their own trains. That service has tests of proficiency, with recognition of the most successful men, accompanied by the corresponding implied reproof to the unproficient, which are of proved value. They are of a kind seldom seen in railroad service. It is true that railroad travel is pretty safe already, but the present discussion was started by an event which makes people dissatisfied with what is commonly called the best railroad service, that is, the best that can be found on the principal lines. When a sudden catastrophe brings a sharp reminder of the well known fact that the mistakes which enginemen and signal men make now and then—and which railroad presidents in newspaper interviews allude to in such a resigned manner as the inevitable concomitant of trusting to fallible human beings—may any day occur coincidently, so as to kill a dozen victims, people begin to ask if these mistakes are as completely unavoidable as is generally assumed.

And this question deserves closer attention than it now receives. Increased safety means, on most roads, better discipline. Better appliances promote safety, but discipline is vital, whatever the appliances may be. But the improvement of discipline involves so many hard problems that railroad managers frequently relax their efforts after perfection too soon, and have no satisfactory explanation ready for injured passengers or an exacting public; and so we have thought it might be well to look at some of these difficulties for a moment. More care in defining them may result in the discovery of easier remedies.

The first difficulty is inability to pay good wages. This has been harped upon so much that we will not enlarge upon it; but the fact stands. Every superintendent knows that if he could hire the men he would like to hire he could have a more reliable set. He would not confine his selections to boys "fresh from the country." This difficulty is the superintendent's, but even when talking to directors we should still call it a difficulty, for stockholders, as long as they are human, will look at the financial question first, and pay-rolls must be increased very slowly, however high the intentions of the directors. We are not complaining of the stockholders; but if some of them would be content to take the profits after they are reasonably earned, instead of demanding them this present half year, honest directors could make expenditures on a rational basis, and some *Railroad Gazette* sermons would lose their point. Indeed, it is worth while for both dividend paying and non-dividend paying roads to study the actual *economy* of good wages.

A second difficulty is lack of acquaintance. The superintendent does not know who are his best men—does not know whom to promote—until he has been with them two or three years, and by that time he has made some poor promotions and very likely will soon take another position himself. Superintendents who have been in constant contact with their men for five or ten years make the best appointments, other things being equal. A division superintendent ought to be paid enough to keep him in one place a good, long term. There should also be a system of records by which even a new superintendent could know men's characters better. This record system is maintained in very good shape on a few roads and ought to be on more. The value of a good record is impaired, however, by two things which need to be fought by every railroad officer who aims to maintain an ideal personnel. The first is favoritism. Directors are human and they do not always resist the impulse to favor their nephews. Lower officers follow their example and all departments feel it. The next is simply another kind of favoritism, the influence of the brotherhoods. Railroad officers have unjustly persecuted employés for acting as spokesman for a brotherhood. These have been too brave. But others have been too cowardly and have kept inefficient men in the service to placate a brotherhood. To appoint and promote and dismiss men wholly on their own merits requires constant courage and much time and labor.

But some managers have coped with the foregoing difficulties with a fair degree of success only to be baffled by another one which exists after all these have been removed. We refer to the narrowness and touchiness which makes men restive under instruction. This is perhaps most noticeable among enginemen, for they are the men in whom the superiority of their natural over their acquired qualifications is most marked. With telegraph operators the fault is more likely to be on the superintendent's side. He prescribes good rules, but does not get men equal to the great and delicate responsibility of carrying them out. For enginemen, however, men of good native ability are selected, but often they are not trained at the outset in the thorough manner that their position demands. In consequence of this absence of proper training beforehand the engineman resents every bit of training ever afterward. We do not say that this is universally true, but the evil is too prevalent to be overlooked. Superintendents can be found in all directions who know that their enginemen are not thoroughly trained in those habits of vigilance which are vital in that office, but neglect to apply that training because they do not know just how to do it. A record of the men is of small value as long as it does not show how vigilant they are in observing signals, or gives only negative information on that point, and that is one reason why the records we have spoken of are not more generally kept.

Giving elementary instruction to a man 30 or 40 years old is a delicate business, but it is just what is needed to stop heedlessness in engine runners, and heedlessness will continue as long as the training is not given. Every superintendent knows that he has to give that sort of training to himself, and he has no right to shirk the duty of giving it to his subordinates. If he himself had to make a 200-mile run every day, involving the reading of 50 or 100 signals at just the right moment, he would put himself through the proper tests to keep his mind duly alert, whether the tests hurt his feelings or not; but when it comes to treating his locomotive runners in the same way he is too tender with their pride. They assert—generally by implication, but it is practically an assertion—that their alertness is already up to the mark. They feel that it is an aspersion on their honor to be questioned like a boy. But some day one of these over-confident men makes a mistake, like a boy, and smashes his engine—if he does not kill some one; and the superintendent can then see that his delicate treatment of the man was a mistake. *That* runner is teachable for a while. The duty of the superintendent is to keep all the runners teachable all the time, and he should see that all of them are tested as that one was tested. This would involve decoy signals, but the superintendent should show the men that decoy signals are not unjust, immoral, mean, or anything else bad; and he should show them this even if he has to work a year to do it.

The Chicago Terminal Commissioners' Report.

In the *Railroad Gazette* of July 8 was given a discussion of the railroad problem of Chicago as reported upon by the committee appointed by the Western Society of Engineers. While this committee was conducting its investigations, a board of three experts was appointed by the Mayor of Chicago to investigate and report on practically the same subject, and was known as the Railway Terminal Commission. On July 11 this commission, composed of George Hackney, Chairman, E. S. Dyer and Fred S. James, submitted its final report to the Mayor and City Council of Chicago. The ordinance creating the commission gives instructions to investigate and report upon all railroads terminating in Chicago together with their terminal facilities and upon the grade crossing evil, and to suggest a remedy whereby the grade crossings can be abolished either by elevating or depressing the tracks of all roads. The report practically recommends:

First—That by reason of the division of the city into three districts by the Chicago River, the railroads entering though these districts should be arranged and classified into separate groups.

Second—The imperative necessity of removing at once from the street surface the railroad traffic is shown by a table of statistics accompanying the report. This table shows that, for thirty-six of the most important street grade crossings, out of over 1,500 now existing, in one day of thirteen hours, be-

tween 6 a. m. and 7 p. m., there was a traffic over them of 68,315 vehicles, 9,150 street cars, 261,942 street car passengers, 119,181 pedestrians. Out of this total traffic there were delayed 15,003 vehicles, 2,320 street cars, 51,367 street car passengers, and 18,212 pedestrians. The total number of delays was 3,031, involving a loss of 6,136 minutes. It was calculated that this loss was equivalent to one-half million dollars annually.

Third—The powers invested in the City Council by virtue of the city charter enable it to direct, with full authority to act, that the streets and highway be preserved to the free and unrestricted use of the public. Legal advice from the corporation counsel states that this power of the Council enables it to exercise its authority so as to give the needed relief to the public from the grade crossing nuisance. It applies also to new streets and highways opened after the railroads were built. The Council can require the removal of all tracks from the surface of the streets and can require them to be elevated or depressed, as may be decided to be the most advisable, or it can require the streets to be carried over or beneath the tracks by viaducts or depressions.

Fourth—The Council, being vested with such power, should adopt and carry into execution some plan best suited to the relief demanded.

The plans that were discussed in the report are: The subway, the viaduct, the depression of the streets below the railroads, the modified plan (so-called) and the elevated plan. These plans were mentioned in the *Railroad Gazette* of July 8, page 512. The Commission favored the elevated plan as being the only feasible one, and gives its reasons therefor about as follows: The elevated plan admits of enlargement and extension to meet further and expected growth of the city. The grouping of the railroads, as before explained, will enable them to combine their interests and build union elevated terminals. As the viaduct system is yet in its infancy, and a further extension will not give the needed relief, a more comprehensive system is needed, and to that end the elevation of the tracks must be insisted upon. Viaducts over tracks must necessarily have 20-ft. head room to accommodate all classes of railroad service. If the viaduct system were extended indefinitely, the streets, otherwise level, would present a succession of 22-ft. elevations, which would materially decrease the carrying capacity of trucks and wagons, and would thereby necessarily increase the total number of vehicles, and thus would aggravate the present congested condition of traffic. The elevated roads suggested should have at least 16-ft. head room above the surface of streets, and it is believed that the elevation of the tracks within the city would not result in any hardship to those industries depending entirely upon railroad connections and facilities. Plans for accommodating these industries are proposed in the report.

The various railroads can greatly reduce the expense to themselves by reconciling their respective interests and come into the city together on the same line or on parallel lines to a union passenger station and could create freight houses and other necessary terminal facilities in such a way as to release much of the property now owned and occupied by them. The limits within which the railroads should be entirely excluded are placed at Twenty-second street on the south, Canal street on the west and Kinzie street on the north. The valuation of the railroad property included in this district when relieved of all improvements represents $50,000,000; it contains 11,616,719 sq. ft. The amount that could be realized from the sale of this land would defray much of the expense of elevating the tracks.

The railroads in the city that are deemed nuisances and are unnecessary are: The St. Charles Air Line beteen Fifteenth and Sixteenth streets, running from the river, east to the Illinois Central, and the stock yards track of the Union Stock Yards & Transfer Co. lying east of their present connection with the Lake Shore & Michigan Southern and the Chicago, Rock Island & Pacific roads. These should be abandoned entirely, owing to the important streets which they intersect. The nature of the business done over them is such that it could readily be taken care of by the outer belt lines without injuring any of the interested parties. The remainder of the tracks of the Stock Yards & Transfer Co. should be elevated; all their connections are required to be elevated.

After submitting their final report, in which were included some legal opinions as to the power of the Council to act, and also a map showing the lands owned by the railroads in the limited district, the resignation of the Commission was accepted.

Since the report of the commission an ordinance requiring the elevation of the St. Charles Air Line has been presented to the City Council. In case it is passed it will probably be taken as a test case. To elevate this line would be to put it into disuse at once, as it is simply a transfer line. This elevation would also interfere with the "Alley" elevated road. The ordinance was presented to the Council in order to test its power to deal with the railroads, as mentioned in the report of the Railway Terminal Commission. If the St. Charles Air Line cannot be elevated, then it should be removed. This is the view of some of the Aldermen who advocated the passage of the ordinance and of those interested in clearing Chicago of grade crossings. As regards the elevation of tracks for all roads entering the city, it is hard at present to get a definite expression of opinion from the railroads. They are waiting for the city to make a move before committing themselves.

The Yankee transatlantic liner and auxiliary cruiser City of Paris came to New York harbor at 1:02 o'clock a. m., July 27, with a new record for the westward voyage and for a day's run. In fact, she beat the record for a day twice during the run, for we do nothing in a small way, we Yankees, and then we brag so, you know. Her time for the run was 5 days 15 hours and 58 minutes. The best previous trip was that of the Teutonic, which ended in New York Aug. 19, 1891, in 5 days 16 hours and 31 minutes; and before that the Majestic held the record. The best day's run of the Teutonic and the best that had ever been made, was 517 knots. On this last trip the City of Paris made one day's run of 519 knots and one of 520. The daily records of the three vessels in their record breaking trips were:

	Majestic.	Teutonic.	City of Paris.
First day	470	460	478
Second day	501	496	501
Third day	497	505	519
Fourth day	501	510	504
Fifth day	491	517	520
Sixth day	317	290	263
	2,777	2,778	2,785

The following table, except the City of Paris, last trip, we printed last August from the New York *Sun*. It gives the highest records as they were made from year to year.

Year.	Ship.	D.	H.	M.
1866	Scotia	8	2	48
1873	Baltic	7	20	9
1875	City of Berlin	7	15	48
1876	Germanic	7	11	37
1877	Britannic	7	10	53
1880	Arizona	7	7	23
1882	Alaska	6	18	37
1884	Oregon	6	11	9
1884	America	6	10	00
1885	Etruria	6	5	31
1887	Umbria	6	4	42
1888	Etruria	6	1	56
1889	City of Paris	5	19	18
1891	Majestic	5	18	6
1891	Teutonic	5	16	31
1892	City of Paris	5	15	58

A speed of 520 knots a day gives 21.667 knots an hour, which is equal to 24.92 statute miles. To be perfectly candid, the City of Paris is still flying the British flag.

A recent discussion of the subject of railroad car ventilation before the Verein für Eisenbahnkunde, at Berlin, Germany, led to the conclusion that all known means of artificially ventilating cars in summer are inexpedient, and cannot be made to serve their purpose as well as open car windows. Artificial ventilation methods, it was held, are of service only in cold weather, and then they are to be of the exhaust kind, the cold air near the car floors being removed by ducts reaching down to them. The Walpert ejectors were recommended for the purpose. The exhausted air, it was pointed out, will be satisfactorily supplanted by fresh air leaking into the car through the door and window cracks. Forcing fresh air into a car by any of the known methods was held to be undesirable because of the likelihood of producing unpleasant drafts, and of introducing smoke and soot into the cars when the supply is taken from the roof, and dust where the supply comes from underneath. If filters be used to overcome this trouble, the efficiency of the whole arrangement, it was claimed, is very soon almost inoperative.

Railroad Commissioner Kirkby, of Ohio, has been visiting Massachusetts with a party of Ohio legislators to see the grade crossing improvements and the numerous elegant stations of the Boston & Albany, as well as other features of railroading in that progressive state. This should prove a wise expenditure of Ohio's money. The object lessons will not only be impressive, but the Massachusett's Commissioners, if they are worthy followers of their predecessors can present the philosophy of good railroading in a clearer way than most commissioners. Mr. Kirkby told a reporter that he expected to provide Ohio with a grade crossing law even better than that of Massachusetts, which, it will be remembered, assesses upon the state 25 per cent. of the cost of a change in grade. No doubt he can do it; but he will have one drawback that should not be overlooked. He can change the highways so that they will run up hill or down, edgewise or even perpendicular; but he can never find so large a proportion of natives who have driven over that kind of roads all their lives and who therefore take naturally to artificial ladders.

Current electrical literature was enriched a few days ago by a circumstantial account of the plans of the New York, New Haven & Hartford for using electric motors for fast trains between New York and New Haven. The story went that the two middle tracks of the four now building would be used for hauling both passenger and freight trains by electricity between those two cities, 73 miles, in 60 minutes. The story probably "pleased the boys," but we never printed it and never suspected that anyone believed it until we saw it in the columns of a technical railroad paper, with this grave comment: "It is to be feared that this prediction, like many similar ones, is too far in advance of the facts to be reliable. That cars may yet be electrically propelled at a rate of 70 miles an hour or more can be believed, but the time does not appear to be at hand." The French call a man of inordinate credulity a *gobemouche*. The word would sometimes be handy on this side of the Atlantic.

NEW PUBLICATIONS.

Railway Car Construction. By William Voss. New York: R. M. Van Arsdale, 1892.

The sub-title of this book is "A work describing in detail and illustrating with scale drawings the different varieties of American cars as now built." This suggests accurately the scope of the book. One hundred and twenty-two quarto pages are occupied with the text and carefully dimensioned detail drawings of the various parts of American cars, both freight and passenger; 34 pages more, together with five large folding plates are given to special descriptions of individual cars which are a Pullman, a Wagner, a Pennsylvania standard passenger, a New York Central standard passenger and a Boston & Albany standard passenger car. In an appendix are given the standards adopted by the Master Car Builders' and the Master Mechanics' Associations, including the Rules of Interchange.

Altogether the book occupies and well fills a unique position in the literature of railroading. It is a book which a great many people have long wanted, and which we are sure they will find, on the whole, very satisfactory. In this office we have very frequent occasion to look up dimensions of cars and parts of cars, and when the "Car Builders' Dictionary" is lacking in just the detail that we want, there comes a long search for drawings which perhaps cannot be found. We expect, therefore, much comfort in Mr. Voss' book.

The volume is made up of papers which have been published in the *National Car and Locomotive Builder* within the last four years. Mr. Voss modestly disclaims any special fitness for the work, but he had the first great qualification of thorough familiarity with what he undertook to write about. He says that no new theories have been advanced and that whoever looks for an ideal car in the pages of his book will be disappointed. We suggest that in this he shows his wisdom. The proper field of his book is exactly the one that he has confined himself to, that is the thorough description, with accurate drawings, giving constructive details and dimensions of actual standard constructions. Although no alphabetical index is given a good table of contents makes reference easy. On the whole the job has been well done and we predict for the book an important and permanent place on the technical book lists.

Machinery Pattern Making. By P. S. Dingley. New York: John Wiley & Sons. Price, $2.

This is a small book of 89 pages and 376 illustrations, being a treatise on pattern making, for practical pattern makers. The different chapters give valuable suggestions as to methods of molding different classes of special work, all of which are profusely illustrated. Those on patterns for Corliss cylinders, and engine frames capable of being changed for different strokes, seem to be particularly valuable. There are 128 full size profiles of gear teeth from 1 to 3 in. pitch for gears of 14 to 800 teeth, and a table of diameters of gears to correspond, also tables of weights, etc. Altogether it is a valuable book in its class.

TRADE CATALOGUES.

The Detroit Lubricator Co. issues a recent edition of its special railroad catalogue showing the Detroit sight-feed lubricator, improved air pump lubricator, cups for rods and guides, the Detroit improved Garfield injector, and various other specialties. The well-known Pendry throttle valve is also well illustrated in this catalogue.

The Van Auken Steam Specialty Company, of Chicago has issued a neat pocket catalogue describing its steam engineering specialties.

THE SCRAP HEAP.

Notes.

The Grand Trunk and Chicago & Grand Trunk have just issued the annual order to employees to be vaccinated.

The City Council of St. John, N. B., has appropriated $150,000 toward the purchase of land and the erection of a grain elevator.

On July 21, fire did about $40,000 damage to the Eastern end of the New York Central's freight house on Green street, Buffalo. The cause of the fire is supposed to be a spark from a locomotive.

The Pennsylvania has prepared an ordinance which it will submit to the Philadelphia Councils in the fall, providing for the removal of all grade crossings from Washington street, Tacony, to the Pennypack Creek, above Holmesburg Junction, Pa.

The latest development of the troubles with passenger conductors and others in Kansas City who are supposed to have been carrying on an extensive and organized system of stealing is, that collectors will be put on all the passenger trains of the Missouri Pacific.

The Erie Canal boatmen are complaining that the railroads are doing all the business. The boats clearing from Buffalo this year up to July 1 were 1,367, against 1,661 last year. The canal men say that their only salvation is to have the canal deepened.

The White Star steamer "Majestic," which sailed from New York on Wednesday, took out 60 tons of California fruit. This was brought across the continent by special train coming over the Central and Union Pacific and Erie in about a week. The California Fruit Transportation Co., which makes the shipment, proposed to send fruit every week during the season to the English market.

In consequence of the fall of water running from the Sarpy and Denmont crevasses, the Illinois Central was able to resume its freight traffic into New Orleans on July 22, though the trains run through from five to eight inches of water along part of the route. Regular passenger business was resumed on Saturday. The Louisville, New Orleans & Texas, which is nearly parallel with the Illinois Central and affected by the same crevasses, will resume its trains August 1.

The magnetic storm which swept over the country Saturday July 16 was of unprecedented severity. The disturbance both in magnitude and intensity of earth currents exceeded any previous record. Many main circuits were completely disabled and lines were worked from Chicago to New Orleans and New York to Memphis by earth current alone. A great sun spot was observed at about the same time as the magnetic storm and a most brilliant aurora in the evening of the same day.

Among the curious accidents due to the recent extensive electrical disturbances the following are reported: An engineman on the New York, Ontario & Western was temporarily paralyzed by lightning, which struck the freight train which he was hauling. The fireman fortunately was uninjured and stopped the train. The roof of a box-car was set on fire by the same stroke, and the trainmen had vainly signaled to the enginemen to stop. A signal tower at the crossing of the Erie and D., L. & W. at Erwin, near Corning, N. Y., was set on fire by lightning and burned; the operator escaped.

Spanish-American Notes.

The petroleum fields in the vicinity of Piura, in Northern Peru, have an area of 7,200 square miles.

A street car system is soon to be constructed in the city of Antofagasta, Chili, with an extension to the neighboring town of Playa Blanca.

The Buenos Ayres Great Southern Railroad will declare a dividend of five per cent. out of earnings for the year ending June 30, 1892, of $4,700,000.

There is strong agitation in Rio de Janeiro to induce the government to take measures tending toward the construction of a great sea wall around the harbor.

The total receipts of the Antofagasta Railroad in Chili and Bolivia for the first four months of this year were $1,246,000. The length of line in operation during that period was 379 miles.

A plan is on foot to organize a new company to run a line of steamships from New Orleans to South American ports. Capital is being solicited in Cincinnati, Chattanooga, and other cities.

The Argentine Minister of Public Works has approved the plans submitted by Messrs. Hope & Gibson for a railroad from Bahia San Clemente to Sevigné, on the Buenos Ayres Great Southern Railroad.

The section of the Cuzco Railroad from Santa Rosa to Marangani, Peru, has just been opened to traffic, and the contractor, Col. Norris, stated that the second section to Sicuani would be opened up on July 28.

A movement has been started in the state of Espirito Santo, Brazil, to build with local capital, aided by the state, a new railroad from Cachoeira de Itapemirim to Mathilde, on the Victoria & Rio Pardo line, intended to benefit the southern municipalities of the state.

There appears to be some prospect of an early inauguration of the iron industry in Argentine by the opening of the Romay iron mines, a short distance from Frias, on the National Central Northern Railroad. This region being covered with extensive forests charcoal iron would be produced.

There would seem to be a good opening for the establishment of new coastwise steamship lines in Brazil. Traffic is suffering severely by lack of tonnage, and English firms are endeavoring to obtain the repeal of the present law which restricts the coasting trade to vessels carrying the Brazilian flag.

The East Argentine Railroad Company sustained a loss from operations for 1891 amounting to $11,500. In spite of this the prospects of the road are said to be improving, owing to the fact that it has now extended into agricultural districts which are beginning to feel the stimulus of better transportation facilities.

A scheme, which is attracting very favorable consideration in Montevideo, Uruguay, has recently been proposed by an engineer named Lebet, which provides for the construction of a dike and breakwaters a considerable distance out in the bay. It would furnish better harbor facilities, and reclaim a large area of land, said to be sufficient to redeem the cost of the undertaking, which is estimated at $20,000,000.

The discoveries of coal in the territory of Neuquen, Argentine, promise to be of great importance. The area underlaid by coal is said to be about 500 square miles. It is proposed to build a railroad from the coal fields to the head of barge navigation on either the Rio Colorado or Rio Negro, a project which is feasible with a comparatively small outlay of money, and would incidentally develop a large district of fertile country.

During 1891 the Argentine railroads carried on a total mileage by the end of the year of 7,676, passengers to the number of 11,310,000, and a total of 4,810,000 tons of freight. The capital cost of this railroad mileage was $359,000,000. The receipts for the year were $11,025,000, with expenditures aggregating $7,900,000, leaving the earnings for the railroads of the entire republic for the year of only $3,124,000, or an average of $407.11 per mile.

The Brazilian Government has ordered 40,000 metallic sleepers for the Central Railroad from a Belgian firm. It has also purchased three cars from the Sorocabana Railroad for immediate relief, pending the securing of new rolling stock which has been and is to be ordered. The condition of the Central Railroad is so bad that it is unable to furnish transportation for the rails for 38 kilometres of the Ubatuba Railroad which are now graded and ready for laying the track.

The La Guayra & Carácas Railroad, Venezuela, 22½ miles long, yielded last year a gross revenue of $770,000, being an increase of $130,000 over 1890. The working expenses amounted to $442,000, leaving a net profit of $328,000. During the year the company added to its rolling stock four new locomotives, four passenger cars, besides a number of freight cars, in addition to building a new depot at La Guayra, a new engine-house, water-tanks, and enlarged terminal facilities.

The São Paulo Railroad, Brazil, having proved its inability to cope with the freight offered it during the past year, applied for permission to duplicate its track upon condition of extending the time within which the line may be expropriated. While this condition may be necessary for raising the needed capital, the refusal of the government to grant the petition can be understood in view of the dilatoriness of the management of this railroad in the past, and of the willingness of other more popular railroads in São Paulo to build double-track lines from the interior of the state to the coast.

The interim report of the board of directors of the Peruvian Corporation, Limited, states that the receipts from the railroads and from Lake Titicaca navigation from July 1, 1891, to Feb. 28, 1892, amounted to £279,328, yielding a net profit of £123,905, being an increase in net earnings of £34,745 over those for the same period of the preceding year. Cable returns for March, April and May, compared with the corresponding months of 1891, show a further gross increase of £24,124. A new steamer, named the "Coya," of 520 tons register, has been shipped out for service on Lake Titicaca. A concession has been obtained for the exclusive navigation of the Rio Desaguadero, Bolivia, the outlet of Lake Titicaca, which recent surveys have proved can be made navigable. Work has already been commenced with that object, and a specially designed dredge is being constructed for improving the approach to the ports on the lake and for permanent use on the river.

World's Fair Notes.

A bill was introduced in Congress last week to appropriate $100,000 for the construction of a building at the Exposition, for a comprehensive exhibit of roads and their construction and maintenance.

The Grounds and Building Committee has assigned to the Krupp Co. a space 160 × 200 ft. on Midway Plaisance. This is for an exhibit of one gun, weighing 120 tons, with a bore 25 in. in diameter and for a number of small pieces of ordnance.

Missouri has about 200 varieties of trees, and specimens of all these will be secured and prepared so as to show sawed, hewed and polished surfaces, also transverse, radial and tangential sections. A working model of a zinc reducing plant will be a feature of the State exhibit.

The request of the Pennsylvania lines and the Lake Shore & Michigan Southern that they be allowed to enter the grounds at the southwestern portion instead of the southeastern has been granted and these roads will use the same tracks as the Baltimore & Ohio and the Illinois Central.

The first pile for the pier at Van Buren street was driven last week, and the work will be pushed to completion as rapidly as possible. Surveyors are at work along the Lake-Front surveying the ground for the proposed viaduct. The pier will be 200 ft. wide and will extend 1,000 feet into the lake.

The Baltimore & Ohio Railroad has appointed Maj. H. J. Pangborn Director to arrange for the company's exhibit at the World's Fair, upon which, it is stated, $75,000 will be expended. Full size models in wood will be made of many of the early types of locomotives and cars as well as of the modern equipment.

Manufacturers have been requested to arrange their exhibits in regular collections as there will be collective exhibits only in the manufactures department. There had been a constantly increasing demand for space from manufacturers and it was decided that the only way to make an adequate exhibit would be in the shape of collections in each branch.

The last of the heavy trusses on the Manufactures building at Jackson Park was raised July 18. From this time work on the great structure, which covers a ground area of 32 acres, will progress rapidly. The force of workmen has been doubled and the contractors have been made to feel the necessity of haste. This building will be used next October on the occasion of the dedicatory ceremonies.

The chief of the Department of Transportation sends a circular to intending exhibitors to say that all applications for space must be made before the first day of August. Applications already received call for at least twice as much space as is at his disposal. All applications received up to the close of the current month will be entitled to consideration. Allotment of space will then begin. In making such allotment the value and importance of each exhibit in its relation to the whole will be duly considered. The chief end to be kept in view will be the completeness and general merit of the whole exhibit of the department. Exhibitors are urged to plan for the best exhibit possible, rather than the largest, and to study especially economy of space. The artistic effect of exhibits will have much to do with their location in the building.

Canadian Notes.

OTTAWA, July 26.

A consignment of 20 miles of steel wire cable has been imported by the Springhill Coal Co., from the works of Sir George Elliott in England. It is to be used in constructing an underground haulage system for the collieries.

An employé of the Ottawa Electric Street Railway Co. has invented a self-lubricating gear for trolleys, and the device was fitted to a trolley on July 4, which has been running ever since without oiling, and shows no effects of friction, nor the necessity for lubrication beyond that which is automatically supplied.

There are 3,194 men employed in the collieries of Vancouver Island, B. C., and the output for 1891 was 1,029,097 tons, compared with 678,140 tons for the previous year. During the 33 years ending Dec. 31, 1891, $53,113,127 worth of gold was yielded in the province. The need of facilities for shipping ores has retarded the progress of the mining districts.

The Minister of Railways and Canals returned to Ottawa last week from Sault Ste. Marie, thoroughly satisfied with the progress of work on the Canadian canal. There is an immense quantity of material already delivered, and the contractors hope shortly to begin building. He found the upper and lower approaches in a forward state, with every prospect of their completion this season. The lock pit excavation is now nearly finished, and a large supply of stone, sand, cement and timber for the lock is on the ground. It is probable that within a few days a commencement will be made of laying the masonry.

The Hon. John Haggart has taken vigorous action since his accession to office to decrease the annual deficit of the Intercolonial road, by reducing the number of employés and decreasing the working expenses in various ways, and the results are beginning to show in the returns of earnings. The report for the last three months show that for the first time in the existence of the road the receipts are more than the expenditures. The revenue for the last fiscal year ending June, 1891, fell about $685,000 behind the expenditures; but the indications for the present year are that there will be a surplus, and it may be hoped the days of deficits on the Intercolonial are over.

The City Council of Montreal has awarded a 30 years, franchise for an electric street railroad to the Montreal City Railway Co. The company intends to change the present horse car system into an electric trolley system at once. There was an exciting contest between the Street Railway Co. and the Williams syndicate of New York, but finally the local company won by a vote of 21 to 15. The Aldermen are charged with being interested in the award of the contract. The Williams company made the best offer. It was the same as the horse car company's in most respects, but offered one per cent. more to the city on the gross receipts above $500,000. Mr. Williams also offered a cash bonus of $200,000 for the charter. The railroad company agrees to pay to the city annually four per cent. of its gross earnings up to $1,000,000, the percentage on earnings above that amount being fixed by a rising scale.

In a few days the Dominion Government will issue a statement showing the volume of traffic upon the Dominion canals during the year 1891, which will show that during 1891 the refund of tolls on grain going through the Welland canal bound for Montreal amounted to $49,834, being at the rate of 18 cents a ton upon 276,861 tons of grain, all of which was transhipped at an intermediate Canadian port. Of the 220,526 tons of grain through the Welland canal to United States ports 17,817 tons were transhipped at Ogdensburg for Montreal, and upon this no refund was made. That the rebate has tended to encourage grain shipments to Europe by way of the St. Lawrence canal and Montreal is shown by these figures: Grain carried down the St. Lawrence canals for 1890 amounted to 242,571, for 1891 to 320,434 tons, an increase of 77,863 tons or 32 per cent. The Canadian Pacific and Grand Trunk carried 185,416 as against 119,208 tons in 1890, an increase of 65,202, or 54 per cent. The total quantity of freight passed through the Welland Canal was 945,239 tons, against 978,692 tons in 1890. Of this United States vessels carried 646,689 tons, while Canadian vessels carried 298,556 tons. Freight in United States ships through the Welland Canal increased last year some 20,000 tons over the previous year's figures, while that carried through the New York canals decreased by 77,500 tons. Of total freight moved on the Welland canal 555,204 tons were agricultural products. On the St. Lawrence canals the total quantity of freight moved was 936,314 tons, of which 416,921 tons were agricultural products and 334,844 were merchandise. On the Ottawa canals 585,041 tons of freight were moved, 565,382 tons being forest products. The total quantity of freight moved on all the canals for the season of 1891 was 2,902,046 tons. The quantity of grain exported from Chicago to Canada by lake during the season of 1891 is reported to be 4,754,708 bushels, and the quantity in transit 2,736,892 bushels. The total value of freight exported from Chicago to Canada by lake for the same period is reported to be $3,916,452, of which amount Canadian vessels carried over $2,000,000.

Railroad Incidents "Out West."

The following dispatches mirror certain features of American civilization as gathered by the Associated Press in one day, July 20.

SALINA, July 20.—Yesterday at the trading post of Mennetta, not far from Vinita, I. T., a newsboy, well acquainted with the Daltons engaged in the Adair train robbery, stated that on Saturday a dead bandit had been buried. The bullet from one of the detectives' rifles had proved fatal. . . . Another one of the three bullets took effect on another bandit, but at last accounts he still survives.

WALLACE, IDAHO, July 20.—Last night three armed men stopped the Northern Pacific train in Summit, near the Montana line. They told Conductor Bradley that he had been warned three times to keep out of this part of the country, and that if he ever came back they would kill him. Bradley reported this to the Northern Pacific authorities . . . .

MINNEAPOLIS, July 20.—Northern Pacific Conductor Dole shot two men riding on the roof of the express car yesterday on the trestle near Valley City. One died instantly and the other will die. The men pulled the bell rope to stop the train. When the conductor ordered them to come down they refused to obey, and he shot them.—[We offer to that conductor the assurance of our distinguished consideration.—EDITOR.]

KANSAS CITY, July 20.—A system of carrying passengers out of Kansas City for half fare has been discovered by railroad officials, who will cause the arrest of numerous ticket scalpers, agents and conductors implicated in the conspiracy.

Fires.

The town of Iron River in West Superior was almost entirely burned July 24. The depot buildings of the Northern Pacific and the Duluth, South Shore & Atlanta were destroyed. The Northern Pacific at once sent a train of freight cars in which the burned out people could store such property as they had saved. The town is a growth of but very few months.

At Ludlow, Ky., on the 26th. coals from a locomotive started a fire which spread through the warehouses of the Standard Oil Co. A considerable quantity of very inflammable materials which were stored there was de

stroyed, together with eight box cars, two tank cars and a good many ties in about 1,000 ft. of track.

The branch shops of the Missouri Car & Foundry Co., at Birmingham, Mo., near Kansas City, were burned on July 22. The loss is estimated at $100,000, with an insurance of $25,000. The plant has not been in operation for several years.

Labor Troubles.

The telegraphers on the Louisville & Nashville have succeeded in getting the advance of pay asked for. The advance is about $5 a month on an average, with extra pay for over 12 hours' work a day.

Most of the section men on the Denver Pacific District of the Union Pacific quit work one day last week. They had been receiving $1.35 a day, and want a restoration to the old rate of $1.50.

Section men on parts of the Wabash recently struck for an increase of wages. It is said that they secured an advance of about $7.50 a month.

A number of night employés on the Pennsylvania Lines at Richmond, Ind., struck July 22. We have no particulars.

The employés of the West Superior Iron and Steel Co. struck July 25. There are 250 of them. The works had been closed for repairs for several days. The men ask the company to sign the Amalgamated scale, and say that they will allow no non-union men to work.

Pacific Railroad Legislation.

Mr. Morgan, Senator from Alabama, has introduced a bill providing that the Government should take possession of the Central and Union Pacific railways until their indebtedness to the Government is discharged; the roads in the meantime to be managed by a board of 15 directors at $10,000 a year and expenses, five to be appointed by the stockholders and 10 by the President. We admire the generous provision for a managing board with salaries of $150,000 a year and expenses. When the Government undertakes to run railroads, it shouldn't be mean about it.

Metropolitan Traction Company.

The Metropolitan Traction Co., which is largely owned in Philadelphia, and controls the Broadway, Sixth avenue, Ninth avenue and several cross-town lines of street railroad in New York City, has been reorganized and the capital stock increased to $30,000,000. The former company was organized under the laws of New Jersey, but it is proposed to incorporate the new company in New York State. For each 100 shares of present stock 120 shares of new stock will be given to stockholders, which will dispose of $24,000,000. The present stockholders will be allowed to subscribe for new stock at par to the extent of 10 per cent. of their holdings, and the remaining $4,000,000 is to be held by the company for improvements.

Arrested for Robbing Freight Cars.

Edward Jones and Alfred I. Gould, conductors, and Edward Coglan, brakeman, of the New York, Pennsylvania & Ohio, were all arrested at Meadville, July 26, for robbing freight cars. Jones is a prominent member of both the Conductors' and Trainmen's Brotherhood, and has been several years Chairman of the Grievance Committee of the local division of the latter organization, which he has represented at numerous conventions.

Terra Cotta.

Terra cotta has been burnt to a white heat for at least two days. Heat and cold cannot effect it. It is too hard to absorb moisture. Frost will not chip it in the winter, as it does stone carving. Being non-absorbent, it will keep its color forever, and not, like stone, suck in all the defilements of the atmosphere. If you take a piece of well-burnt terra cotta and soak it for a year in the sea, then burn it for a year in a furnace, then let it be frozen for a year with the thermometer at thirty degrees below zero, then tumble it down a mountain side, or drop it out of a balloon, and then examine it carefully and you will find it about the same as it was at the beginning, with the exception of an odd scratch or two on the surface, where it may have come in contact with a flint.—*The Technograph.*

Artificial Indiarubber.

About eight years ago Dr. W. A. Tilden, F. R. S., discovered among the volatile compounds obtained by the action of moderate heat upon oil of turpentine, the hydrocarbon "isoprene," which had previously been identified by Greville Williams among the products of the destructive distillation of crude indiarubber. Isoprene can be converted back into true elastic indiarubber by the action of strong acids, such as hydrochloric (muriatic) acid. Some time ago Dr. Tilden produced a quantity of isoprene from turpentine, which after being kept for a few weeks became thick and syrupy, with humps of a hard elastic substance floating in it. These humps proved to be indiarubber, and are supposed to have been caused by the accidental presence of acetic or formic acid in the solution. The artificial rubber appears to be analogous in every respect to the natural product, and is equally susceptible of vulcanization. Experiments are making to ascertain the feasibility of manufacturing rubber from turpentine on a commercial scale. An interesting field for experiments is opened up by this discovery, as other resins may be similarly susceptible of conversioninto elastic compounds, possessing properties that may have peculiar value.

A Locomotive Race.

The agile and fertile young man who contributes "vast and varied misinformation" on railroad matters to the daily papers has discovered one of the most interesting plans of the World's Fair officers. It is to have a race from New York to Chicago and back between an English and an American locomotive. He says that an English locomotive will be brought over which will burn English coal,and it will be manned with a crew who will speak with an English accent. The reporter predicts that "John Bull will have to hump himself."

Spanish Railroads.

The first railroad opened to the public in Spain was that from Barcelona to Mataró, which was completed in 1848. Since then the system of Spanish roads has increased to a total of 10,000 kilometres, the years of most active railroad construction having been those of 1860, 1863 and 1865. According to official figures the rolling stock of all the railroads of the kingdom consists of 2,200 locomotives, 6,000 passenger cars and 24,000 freight cars. Although the railroad system touches all the provincial capitals except Almeria and Teruel, it is estimated that only one-third of the population of Spain enjoys the facilities of rail communication.

LOCOMOTIVE BUILDING.

The Illinois Central has issued specifications for 10 six-wheeled coupled suburban engines.

The Rio Grande Western will order three additiona compound engines for passenger service.

The Savannah, Americus & Montgomery has ordered four consolidation engines from the Richmond Locomotive Works.

The New York, Chicago & St. Louis has placed an order for ten 10 wheel engines with the Baldwin Locomotive Works.

The report printed last week that the Chicago & West Michigan had ordered four switching engines and would soon order new cars is incorrect.

The Toledo, Ann Arbor & North Michigan is asking bids for six consolidation engines. The awarding of this contract will probably be postponed for some time.

The Buffalo, Rochester & Pittsburgh has received from the Baldwin Locomotive Works four compound locomotives, which are now being set up at the Bradford shops. They are all of the consolidation pattern.

H. K. Porter & Co., of Pittsburgh, have completed two locomotives for the heavy grades of the Sabana railroad of the United States of Colombia, S. A. The engines will be shipped from New York in a few days.

The Mexico, Ceurnavaca & Pacific, a new road out of the City of Mexico, and the Mexican Northern have ordered compound engines of the Johnstone type. The one for the Mexico, Ceurnavaca & Pacific is of the ten-wheel type, and will be built by the Rhode Island Locomotive Works.

The Grant Locomotive Works have completed the repairs to the South Side elevated engines taken in some time ago. Three engines from the Elgin, Joliet & Eastern are now at the works for general repairs. Five more engines from the same road will soon be taken in hand for general repairs. Material is ordered for five new consolidation engines. These engines are to be built at once to organize the force now employed, and to prepare for new work. Inside of two months the works can run to their full capacity. The foundry will be started this week.

The Chicago & Northwestern has placed an order for three compound engines, two from the Baldwin Works and one from the Schenectady. The Schenectady engine and one of the Baldwin engines are to be ten-wheelers; the remaining Baldwin engine is to be an eight-wheeler. The Chicago & Northwestern officers are much pleased with the action of the compound engines on the elevated road in Chicago, and their example has led to the present experiment, by which it will be determined whether or not a reduction of smoke, a saving in fuel, and a decrease in the sound of the exhaust can be made on the Chicago & Northwestern.

CAR BUILDING.

The Maine Central has placed an order with the Laconia Car Works at Laconia, N. H., for 12 first-class passenger cars.

Orders have been received at the Canadian Pacific car shops at Perth, Ont., for building 100 grain cars. A large number of box and ballast cars are now undergoing repairs.

The Buffalo, Rochester & Pittsburgh has built a new pay car in the company's shop in Rochester. The interior is in quartered oak of antique finish and elaborate design. One end of the car is arranged for the accommodation of the paymaster, with desks, etc. In the middle is the stateroom and the other end is fitted up for observation purposes.

The Crossen Car Mfg. Co., Cobourg, Ont., has begun the manufacture of street cars for all systems, and is prepared to do a large business in this line. The firm is also very busy building both day passenger, sleeping and dining cars and freight cars. A dining car recently built for the Canapian Pacific has some new features in that the doors are sliding instead of being hung on hinges, and in the substitution of recessed alcoves between windows, in which are convenient shelves for mirrors, as now generally used. This company is building 12 sleeping cars for the Canadian Pacific.

The Michigan Central shops at St. Thomas, Ont., are very busy just now with repair work, besides the building of new cars. The third of the new passenger cars is about ready to leave the shops, and the fourth has been commenced. New 60,000-lb. freight cars are being built as fast as possible, though not a great deal has been accomplished in this work for some time past, owing to the large amount of other work.

BRIDGE BUILDING.

Albany, N. Y.—The Secretary of War has decided against the application for permission to build a bridge across the Hudson River between the north end of Albany and Bath, N. Y.

Alton, Ill.—The high water has caused a suspension of the work on the bridge of the Chicago, Burlington & Quincy across the Mississippi River at Alton, but a great amount of material has arrived on the ground, and the work will be resumed as soon as the high water recedes.

Barrie, Ont.—Tenders are wanted until Aug. 16 for the construction of two bridges on concession line between the second and third concession of Oro. Address Thos. Drury Crown Hill P. O., or James Ross, Reeve, Barrie, O

Bedford City, Va.—The Supervisors of Bedford County are corresponding with the Supervisors of Pittsylvania County in reference to building a joint bridge over the Staunton River.

Bellefonte, Mo.—Active work has been commenced on the erection of the bridge at Bellefonte Bluffs, near St. Louis, for the Chicago, Burlington & Quincy. The work on the caissons is in progress, and also on the southern approach. Material for the bridge is constantly arriving.

Belleville, Ont.—The G. & J. Brown Mfg.Co., Belleville, Ont, has just completed a new steel bridge over Jeanette Creek, ten miles from Chatham, Kent County It is constructed on steel piles instead of oak, and the cost is said to be not very much greater. This company is now at work on a steel swing bridge at Chatham, which will be completed in July, also a steel bridge, 150 ft. span, for Baden, Ont.

Boston.—Plans are ready for the L street bridge draw, which is to be a single of 40 ft. span across the channel, after the type of the Federal street draw. It will have two roadways each 19 ft. wide, and sidewalks 5 ft. wide. Its height above mean tide will be 21 ft. The draw is to be completed by November. The contract will be let next week.

Cleveland, O.—The Board of Control has directed a report made on the advisability of replacing the wooden Petrie street bridge damaged by a recent flood, with an iron structure.

Duluth, Minn.—There is considerable opposition to the building of the bridge from Rice's Point, Duluth, to Connor's Point, Superior. The Chief of Engineers opposes the construction of the bridge, but the Secretary of the Interior has authorized, as far as it is in his power, the building of the bridge.

Eganville, Ont.—The municipal authorities of Eganville have instructed their engineer to prepare plans for the construction of a truss bridge across the Bonnechere River at that point to replace the present bridge, which is in a dilapidated condition.

Elkton, Md.—The Youngstown Bridge Co. of Ohio, made the lowest bid for rebuilding the bridge over the Bohemia River, which is to be built by the Cecil County Commissioners. The bridge is 1,352 ft. long between abutments, with a 90-ft. draw. The bid of the Youngstown Bridge Co. was $14,967.

Elmira, Ont.—John H. Ruppel is now receiving tenders for the construction of an iron or steel bridge across the Canaquagigue River opposite this village.

Florence, Ala.—Neely, Smith & Co., of Florence, have the contract for the foundation and masonry work for the new iron bridge to be built by the Memphis & Charleston over the Tennessee River at this town.

Kincardine, Ont.—An iron bridge on iron pile piers will be erected across the river Panetangone at this place.

Kingston, Ont.—A deputation recently visited Sharpton, Ont., for the purpose of locating an iron or steel bridge across Mud Lake to Florida. A civil engineer will be engaged to decide the site for the bridge and the estimated cost.

Knowlton, Que.—Tenders will be received this week for the construction and masonry work of abutments for three iron bridges in the village of Knowlton, P. Q. The Village Council has decided to build three iron bridges.

London, Ont.—Sealed tenders will be received by the Corporation of the counties of Perth and Middlesex at the Clerk's office, London, Ont., until noon on Aug. 3, for the erection of the iron superstructure of a bridge over the river Thames, between the township of Blanchard and West Nissouri, known as the "Perth Bridge." Said superstructure to consist of two spans, viz.: One of 86 ft. and one of 101 ft., each in the clear. The roadway is to be 14 ft. wide. Tenders are to be accompanied by detailed plans and specifications.

Mamaroneck, N. Y.—The New York, New Haven & Hartford is building a new bridge over the Sheldrake River, near Bonnybrook Park, Marmaroneck.

Ottawa, Ont.—A deputation from County and City Councils recently waited on Hon. Mr. Haggart, urging the construction of two new iron bridges, one across the breakwater at Hog's Back and the other across the canal at the south of Concession street.

Philadelphia.—It is proposed to rebuild the Gray's Ferry Bridge, which is used by the city and the Pennsylvania Railroad. A conference was held last week between the Director of Public Works and the railroad engineers to apportion the cost, but no agreement was reached.

Poquonock, Conn.—A new iron bridge is to be built over the Farmington River by this town, and an engineer is now examining plans submitted by bridge companies for the bridge.

Rome, N. Y.—The contract for building a bridge across the Erie Canal at Madison street was let last week to W. H. Shepard & Sons, of Havana, N. Y. The contract price is $3,800.

Sioux City, Ia.—Proposals were opened last week for building a bridge across Floyd Creek at Leech street. Bids made by the Youngstown Bridge Co., the Wrought Iron Bridge Co., the King Bridge Co., the Milwaukee Bridge & Iron Co., and S. M. Hewitt were rejected on account of slight informalities. The following bids were considered: A. Y. Bayne & Co., of Minneapolis: For iron bridge and approaches $5,694; for combination bridge and fill approaches $4,594, or with iron floor beams $4,944. George Adgate: For iron bridge on piles, $4,800; iron bridge on iron piers, $5,600; combination bridge, $3,800. Goodrich & Robson: Iron bridge on iron piers, $6,550, and combination bridge on piles, $5,600. The contract was not awarded.

A. Y. Bayne & Co. have a contract to build a bridge for the city at East Seventh street for $2,600.

Snohomish, Wash.—The Great Northern has let the contract for building the span bridge west of the Cascades to Hoffman & Bates, of Portland, Or. There are a number of bridges to be built from Snohomish up to the summit, most of them crossing the Skykomish River. Work will begin immediately on the Snohomish bridge.

Spring City, Tenn.—J. L. McPherson, of Spring City, wants bids on an iron bridge 250 ft. long.

Sutton, W. Va.—The County Court has decided to build a suspension bridge across Elk River. G. W. Curtin and J. S. Hyer are Commissioners to contract for the building of the bridge.

Toledo, O.—The Lake Shore & Michigan Southern has commenced work on a new steel and iron bridge over its tracks at Maumee avenue. Plans are also being prepared for a new steel bridge over the tracks at Broadway.

Woodstock, Ont.—G. C. Eden, Town Clerk, will receve tenders up to Aug. 15 for the construction of a wrought iron or steel bridge in the town of Woodstock. Specifications may be had at the office of the Town Engineer.

Yankton, S. D.—The Yankton Bridge Co., capital stock $1,000,000, was organized in this city last week. The company intends to construct a combined wagon and railroad bridge across the Missouri River under a bill granting the franchise recently passed by Congress.

The bridge will be used by the Yankton, Norfolk & Southwestrrn Railroad. The directors of the company are: Newton Edmunds, E. P. Wilcox, J. C. McVay, P. Ohlman, Robert J. Gamble, John T. M. Pierce, J. R. Hanson, George R. Scougal, William M. Powers and W. B. Valentine, of Yankton, and S. L. Tate, of Sioux Falls. The officers are: R. J. Gamble, President; M. P. Ohlman, Vice-President; J. R. Hanson, Treasurer, and G. R. Scougal, Treasurer.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Dexter & Piscataquis, semi-annual, 2½ per cent., also a special dividend of 1 per cent.

Illinois Central, semi-annual, 2½ per cent., payable Sept. 1.

Terre Haute & Indianapolis, semi-annual, 3 per cent., payable Aug. 1.

Zanesville Terminal, 2 per cent., payable Aug. 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston, Hoosac Tunnel & Western, annual, Saratoga Springs, N. Y., Aug. 17, for the election of directors and to consider the consolidation with the Fitchburg.

Chicago & West Michigan, special, Grand Rapids, Mich., Aug. 16, to authorize the purchase of the Chicago & North Michigan.

Long Island Boynton Bicycle, annual, New York, N. Y., Aug. 5.

Pennsylvania, Lehigh & Eastern, special, Philadelphia, Pa., Aug. 2.

Toronto, Hamilton & Buffalo, special, Aug. 9.

Upper Coos, Lancaster, N. H., Aug. 16.

Troy, Saratoga & Northern, annual, Saratoga Springs, N. Y., Aug. 17.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New England Railroad Club* holds regular meetings, at the United States Hotel, Beach street, Boston, Mass., on the second Monday of each alternate month commencing January.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* holds regular meetings on the third Thursday in each month, at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, N. Y. The next meeting will be Sept. 15.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m. in the directors' room of the St. Paul Union Station.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesday in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month. The annual meeting is held on the third Saturday in January. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursday at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Association of Civil Engineers of Dallas* meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 o clock p. m. on the first Friday of each month.

The *Tacoma Society of Civil Engineers and Architects* holds regular meetings on the third Friday of each month, in its rooms, 201 and 202 Washington Building, Tacoma, Wash.

The *Engineers and Architects' Club of Louisville* holds regular meetings on the second Thursday of each month, at 8 o'clock p. m., at its rooms in the Norton Building, Louisville, Ky.

The *Association of Engineers of Virginia* holds regular meetings at Roanoke, on the second Saturday in each month, at 8 p. m., except the months of July and August.

Association of Engineers of Virginia.

The regular meeting wus held in Richmond, July 4 and 5, at Ford's Hotel, Mr. W. H. Adams in the chair. The session was opened by the reading of the address of the President, Mr. Clarence Coleman. The following papers were read during the session: "The Necessity of Co-operation by American Engineers," Mr. T. W. M. Draper: "Establishing a School for Young Men to Fit Themselves to Be Railroad Men," or "A National Railroad College," Mr. Herman Crueger; "Easement Curves," Mr. Chas. H. Rice; "A Plea for the Establishment of a United States Weather and Signal Station at Roanoke," Mr. Chas. H. Churchill; "Construction of the Iron and Coal Pier of the N. & W. R R. at Lambert's Point," Mr. W. W. Coe; "Historical Notes Bearing Upon the Work of the First Mining Engineer of the Colony of Virginia," Mr. Wm. H. Adams. The Committee on the Improvements of Highways in the State presented their report, but it was referred back. This subject will again come up for discussion at the next regular meeting. The Secretary and Treasurer's report of the six months' work of the Association was received. The following gentlemen were elected members; Mr. E. T. D. Myers, honorary member; Prof. Wm. C. Brown, Mr. Walter L. Patterson, Mr. Frank Backman, Mr. William B. Stephens, Mr. Samuel G. Gaillard, Mr. James C. Moen, Mr. Archibald L. Sproul, Mr. John T. Morgan, Mr. Julian R. Downman, Mr. James S. Green, and Mr. J. H. Dunstan, active members.

The Northern Pacific Mechanical Department.

The Master Mechanics and Car Builders of the Northern Pacific held a three days' session in St. Paul last week discussing matters relating to the mechanical department. John Hickey, Superintendent of Motive Power, was Chairman; O. H. Reynolds, Mechanical Engineer, Secretary, and J. C. Barber, Master Car Builder, led the discussion of subjects relating to the car department. The next meeting will be held at Tacoma, Wash., on Nov. 20, and the future meetings will be held every four months at the eastern and western termini of the road. The subjects discussed were discipline of men, wearing parts of cars, air brakes and air brake practice, and draft rigging and running gear.

The division Master Mechanics present were: H. H. Warren, Tacoma; Wm. Moir, Sprague; B. Haskell, Missoula; C. K. Lord, Mandan; S. L. Bean, Fargo; R. H. Gilmour, Winnipeg; C. Adam Bardsley, Brainerd. The car foremen in attendance were: John Murphy, Portland; Daniel Wallis, Sprague; E. T. Kelsey, Missoula; L. H. Lashorn, Livingston; Joseph Pitcher, Mandan; David Child, Brainerd; M. W. Smeades, Minneapolis; W. R. Nichol, Como, and John Hill, St. Paul. F. N. Risteen, road foreman of engines of the Western Division, and Charles Sherwood, of the Central Division, were also in attendance.

PERSONAL.

—Mr. J. W. White, for many years Treasurer of the Nashua & Lowell road, died at his home at Nashua, N. H., July 22.

—Mr. Elliott Monett has resigned as Eastern passenger agent of the Wabash to start a Chicago office for Peter McDonell as a partner in the firm.

—Governor Burleigh has nominated Benjamin F. Cadbourne, of Biddeford, State Railroad Commissioner of Maine to fill the vacancy caused by the death of Mr. Roscoe L. Bowers.

—Mr. J. F. Kelsey, who some years ago was President and Treasurer of the Peoria, Pekin & Jacksonville road, now included in the Jacksonville Southeastern line, died at Peoria, Ill., July 22.

—Mr. H. O. Duerr has resigned his position with the Toledo Bridge Company and organized the firm of H. O. Duerr & Co., engineers and contractors, with offices in the Drexel Building, Philadelphia.

—Mr. A. W. Perrin, General Passenger Agent of the Housatonic road, resigned this week, and has been succeeded by Charles B. Van Alstyne, Assistant General Freight Agent of the Housatonic system. The duties of the two positions will be combined.

—President Van Horne, Vice President T. G. Shaughnessy and Director R. B. Angus, of Montreal, are making an extended trip through the maritime provinces. The object of the visit is reported to be in connection with an inspection of the Intercolonial road.

—Mr. J. W. Dabney, who recently entered the service of the Missouri, Kansas & Texas as Civil Engineer, died at Denison, Tex., last week. He had been engaged in mining operations in Mexico for several years, but was formerly connected with Texas railroads. He was about 35 years of age.

—Col. Samuel Tate, who died in Memphis July 26, was formerly President of the Memphis & Charleston Railroad and one of the proprietors and a director in the Memphis & Little Rock Railroad, besides being interested in many other railroad enterprises. He retired from active life several years ago.

— Mr. T. J. McGuire, formerly Division Superintendent of the Louisville, New Albany & Chicago at Monon, Ind., has resigned to become General Manager of the Bedford Belt roads. The office of Division Superintendent on this road has been abolished, and Mr. G. K. Lowell, formerly Division Superintendent, has been promoted to be Assistant General Superintendent.

—Mr. Charles L. Cole, who becomes General Freight Agent of the Pennsylvania Company, under the new organization, has been Assistant General Freight Agent since 1871. He had previously been a clerk at the Pittsburgh transfer station and in the general freight office of the Pittsbugh, Fort Wayne & Chicago.

—Mr. D. E. Browne, Assistant General Passenger & Freight Agent of the Western lines of the Canadian Pacific, has sailed for China. He will also go to India and New Zealand. One of the reported purposes of his trip is to arrange for an Australian line of steamers to run in connection with the Canadian Pacific.

—Mr. John Ewan has fully recovered his health and has been appointed superintendent of the Indianapolis division of the Louisville, New Albany & Chicago, with headquarters at Monon, Ind. Mr. Ewan was for 26 years on the old Bee Line, leaving it to go to the Monon shortly after its consolidation with the Big Four. A few months later he resigned on account of ill health.

—Mr. J. S. B. Thompson, Assistant to Col. W. H. Green, General Manager of the Richmond & Danville Railroad, has, it is announced, been appointed General Superintendent of the road north of Salisbury, N. C., including the Virginia Midland and the Manassas and Leesburg branches, etc. Mr. Thompson is a nephew of the late Hon. John S. Barbour and entered the employ of the old Virginia Midland road in a subordinate capacity some years ago.

—Mr. William Stewart, who has been General Freight Agent of the Pennsylvania lines west of Pittsburg, has been appointed Freight Traffic Manager. Mr. Stewart has been connected with the Pennsylvania lines since 1852, when he was a clerk in the general freight office of the Cleveland to Pittsburgh. He became General Freight Agent of that road in 1864 and Superintendent four years later, and held both offices until his appointment as General Freight Agent of the Pennsylvania Co. in 1871.

—Gen. I. H. F. Sweetzer, of Titusville, Pa., died there this week, aged 67. In 1864 he was General Manager of the Atlantic & Great Western road, and for five years previously held a similar position on the Oil Creek road, now the Western New York & Pennsylvania. At one time he was one of the largest manufacturers in Cleveland. Later he entered the banking business at Corry, Pa., and was President of the Corry National Bank up to 1889, when he retired from active business.

—Mr. E. C. Knight, who owned an extensive sugar refining factory at Philadelphia, died at Cape May, July 21, in his 80th year. Mr. Knight had continued an independent sugar refiner until the spring of this year, when his business was absorbed by the Sugar Trust. During the 40 years of his business life he had served as a director in a great number of railroads, insurance and trust companies and other financial institutions. He was for years a director of the Central of New Jersey, and was President of the road from 1876 to 1880, a director of the Philadelphia & Reading until 1885 and also one of the reorganization trustees and was largely interested in the North Pennsylvania Railroad since its organization, and its President at his death. He was director, among other companies, of the Lackawanna & Bloomsburgh, the Pennsylvania, Trenton & West Jersey and other roads. In 1859 Mr. Knight made several inventions in sleeping cars, organized a company which built a number of cars and was afterward merged with another company.

—Mr. Thomas Cook, the head of the well-known firm of excursion managers, died at his home near Leicester, Eng., last week, in his 84th year. His first attempt at managing an excursion party was made in 1841, when he arranged to run a special train from Leicester to Loughborough, over the Midland road, to a temperance meeting, and carried 570 passengers. That was said to be the first publicly advertised excursion train ever run in England. Mr. Cook carried out several other excursions in different parts of the country, and his success was so great that 40 years ago he was made excursion agent for the Midland railroad, a position which he, and afterward the firm which he founded, has held ever since. About 30 years ago Mr. Cook conducted a small party of tourists to Paris, the first excursion of its kind out of England that had ever been held. On his return he started an office in London. That was the real beginning of a business which has now become extended all over the world. A few years later he conducted a party to Egppt, through the Holy Land, and then back to England. In 1874 Mr. Cook retired from active business, and his son, John M. Cook, assumed the management of the business.

—Mr. Thomas Nickerson, formerly President of the Atchison, Topeka & Santa Fe and of the Mexican Central, died at his residence in Newtown, near Boston, July 24. Mr. Nickerson was born on Cape Cod 81 years ago, and was the youngest of five brothers left fatherless and almost penniless in their youth who all attained prosperity. Mr. Nickerson was for a number of years a merchant in Boston, the firm owning a large fleet of vessels. He retired in 1870 to give his attention to railroading, and was elected director of the Atchison, Topeka & Santa Fe in 1872 and President of the company soon afterward, when it owned 50 miles of road. He was President of the Atchison for five years and built 800 miles of road before he retired. On leaving the Presidency of the Atchison Mr. Nickerson was engaged in harmonizing the New York and Boston interests in the Atlantic & Pacific. In 1884 he was elected a Director and President of the Mexican Central and built a great part of that road. He was also connected with other roads in the southwestern part of this country. He retired from active life some 10 years ago. Two of Mr. Nickerson's brothers, who died before him, attained prominence in railroad life. Joseph, an older brother, was one of the largest stockholders of the Atchison, and another brother, Frederick, was a Director of the Union Pacific at the time of his death a few years ago.

ELECTIONS AND APPOINTMENTS.

Adirondack & St. Lawrence.—W. H. Pettibone, Acting Superintendent of the Southern Division, has been assigned to duty as Superintendent of the Northern Division, headquarters, Malone, N. Y. James MacBeth, Superintendent of Motive Power and Rolling Stock, has been relieved of duty as Acting Superintendent of the Northern Division, and will, in addition to his other duties, be assigned to construction work between Tupper Lake and Fulton Chain. R. T. McKeever, Train Master, has been appointed Acting Superintendent, with headquarters at Herkimer, N. Y.

Birmingham, Laney & Piedmont.—The following are now the officers of this company: President and Treasurer, J. C. Laney, Laney, Ala.; Secretary, C. Dunn, Laney; Chief Engineer, P. S. Fitzgerald, Gadsden, Ala.; J. A. Bilbro, Attorney, Gadsden. The New York representative is Edward Morton, 53 Broadway.

Boston & Maine.—M. T. Donovan, Assistant General Freight Agent, has been appointed General Freight Agent of the road, taking effect Aug. 1, to fill the vacancy caused by the promotion of W. F. Berry to the place of General Traffic Manager.

Chicago Milwaukee & St. Paul.—E. Hastings has succeeded T. H. Dancy as Superintendent of the Milwaukee terminals.

Chickamauga & Durham.—The following are the officers of the company: S. F. Parrott, President and General Manager; Gordon Lee, Secretary and Treasurer, and J. I. Henderson, Superintendent and Chief Engineer.

Cleveland, Cincinnati, Chicago & St. Louis.—D. F. Coe, Assistant General Freight Agent of the Michigan division, will retire on Aug. 1, and it is reported will be succeeded by Homer F. Frost, who has for some time been General Agent at Louisville, Ky. Mr. Frost will be succeeded at Louisville by W. W. Root, who has represented the Elkhart lines at Cincinnati.

Columbus Southern.—At the annual meeting of stockholders, W. B. Low was elected President, J. W. English, Vice-President; G. W. Parrot, Secretary and Treasurer, and Cecil Gabbett, General Manager, with office at Columbus, Ga.

Duluth, Red Wing & Southern.—A meeting of the company was held at Red Wing, Minn., July 21. Resolutions were passed in regard to the death of F. W. Hoyt, President. T. B. Sheldon was elected President in place of Mr. Hoyt, deceased; G. H. Crary elected Treasurer in place of T. B. Sheldon, and H. E. Perkins was chosen a director in place of Mr. Hoyt.

Girardville.—The officers of this new company, which is a branch of the Pennsylvania road, are: President, Henry D. Welch; Secretary and Treasurer, Albert Hewson, and Chief Engineer, Joseph U. Crawford, all of Philadelphia. The directors are Samuel Rae, Joseph U. Crawford, John P. Green, P. B. Prince, F. W. Schwarz.

Iberia & Vermillion.—The following are the officers of the company: J. Krutt-schnitt, President, New Orleans; A. C. Pickett, Secretary, New Iberia, La.; E. B. Cushing, Constructing Engineer, Houston, Tex., and I. A. Cottingham, Assistant Engineer, New Iberia, La.

Joliet, DeKalb & Northern.—The following officers have been elected: William L. Elwood, DeKalb, Ill., President; James B. Speer, Joliet, Ill., Vice-President; Lester Soule, Joliet, Ill., General Manager, and Samuel H. Doty, of Warren, Pa., Chief Engineer. The Chicago office is at Room 1106, Rookery Building.

Kansas City, Pittsburgh & Western.—The directors of this new company are: Edward L. Martin, Richard Gentry, Arthur E. Stilwell, J. McD. Trimble, Churchill J. White and William S. Taylor, of Kansas City, Mo., Charles Dixon, Omar D. Hall and J. Jay Spencer, of Kansas City, Kan.

Little Falls & Dolgeville.—The stockholders of the road have elected the following officers: President, Carl Amman, of New York; Vice-Presidents, Hon. Titus Sheard, of Little Falls, and Alfred Dolge, of Dolgeville, N. Y.; Secretary, Edmund Wauckel, of New York; Directors, W. G. Milligan, J. S. Barnet, J. J. Gilbert, of Little Falls; Karl Fink, of New York; E. A. Brown, Julius Breckwoldt, Edward Dedicke and Ernest Polscher, of Dolgeville.

Louisville, New Albany & Chicago.—George K. Lowell, formerly Division Superintendent, has been appointed Assistant General Superintendent, and the former office will be abolished. His headquarters will probably be continued at Lafayette, Ind.

Loveland Pass Mining & Railroad Tunnel.—The company held its annual election at Denver last week. The following directors were chosen: F. L. Ames, S. H. H. Clark, W. A. Deuel, W. Teller and P. Toubey, all of the Union Pacific. The company was organized years ago to build a road from Georgetown across to the Snake River country.

Mexican Central.—R. M. Thomas has been appointed Acting Division Superintendent of the Guadalajara division, vice H. A. Vaughn resigned. His headquarters will be at Guadalajara, Mex.

Middlesex Valley.—R. F. Uniacke, Rushville, N. Y. has been appointed Chief Engineer of this road, vice N. F. Jones, deceased.

Nanticoke & Newport.—The following are the first directors: Thomas D. Shea, John Smelter, Jr., Nanticoke, Pa.; John B. Reynolds, C. H. Reynolds, Kingston, Pa.; John T. Lenahan, Wilkesbarre, Pa.

North Carolina.—At a meeting of the stockholders of the road, W. F. Koruegay was elected President, and P. B. Ruffin, Secretary and Treasurer.

Ohio Southern.—Alexander E. Tremp, for four years master mechanic of the road, has been succeeded by Mr. McFall, of Brazil, Ind., whose headquarters will be at Springfield, O.

Pennsylvania.—A. M. Keppel, Jr., who has been Assistant Division Operator of the Pittsburgh division, has been promoted to be Supervisor of Signals for the division. He succeeds W. M. Kinch, who resigned to accept a position on the New York Central.

Pennsylvania Co.—In accordance with the revised organization of this company, the following appointments have been made to take effect this day: William Stewart, Freight Traffic Manager, office at Pittsburgh; Charles L. Cole, General Freight Agent, office at Pittsburgh. The office of Assistant General Freight Agent has been abolished.

Pittsburgh Marion & Chicago.—The office of General Manager of this company has been abolished and the office of Superintendent created. George W. Dixon has been appointed Superintendent, with headquarters at New Lisbon, O.

Poughkeepsie Bridge & Railroad Co.—The following were named as directors in the charter filed in New York last week: John W. Brock, Richard Y. Cook, Harry F. West, Charles E. Morgan, Jr., Arthur E. Newbold and George A. Fletcher, of Philadelphia; Milton A. Fowler, of Poughkeepsie, N. Y.; Lewis P. Dash, Alfred A. Gardner, Ernst T. Shuman, William J. Cromwell and William R. Carlisle, of New York, and Robert I. Lee, of Plainfield, N. Y.

Rio Grande Southern.—C. F. W. Felt, for the past two years Resident Engineer of the Northern Division of the Gulf, Colorado & Santa Fe, at Cleburne, Tex., has accepted the position of office engineer of this road at Ridgeway, Col.

Salt Lake & Los Angeles.—The officers of this road, formerly the Saltair, are as follows: George Q. Cannon, President; Joseph F. Smith, vice-president; Nephi W. Clayton, General Manager, I. A. Clayton, Secretary, all of Salt Lake City, Utah.

San Luis & San Joaquin.—The following are named as the first directors: L. C. Branch, Louis F. Gilmore, J. J. Scrivner and George W. Schell, of San Francisco, and Myron Angel, of San Luis Obispo, Cal.

Savannah, Americus & Montgomery.—Carroll H. Smith, General Eastern Agent at New York, has been appointed General Western Agent, and transferred to St. Louis, with offices at 215 North Fourth street.

Southern Iowa.—The present officers of this road are as follows: Paul Morton, President, and G. W. Traer, Treasurer, Rookery Building, Chicago; T. C. Mauro, Secretary, and T. J. Phillips, General Superintendent, Ottumwa, Iowa.

Union Transfer & Exchange.—The following are the incorporators of this company: J. B. Oliver, Pittsburgh, President, and James E. Umbstaetter, John F. Steel, R. C. McLean, S. P. Connor, J. W. Patterson, of Pittsburgh, and Francis J. Forrence, Allegheny, Pa.

Utah Central. -The annual meeting was held at Salt Lake City July 21. The following directors were elected: J. Collett, E. C. Henderson, Le Grand Young, Joseph Richardson, P. L. Williams, C. D. Lavey, J. H. Hurd, E. B. Critchlow, R. H. Cabell.

Yankton, Norfolk & Southwestern.—J. H. Larcy, Dolphin, Neb., and Thomas Pattern, Yankton, S. D., are Division Engineers of this road. N. W. Gifford is President and W. E. Shaw is Secretary of the Traffic Construction Co. of Chicago, which is to build the road.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Adirondack & St. Lawrence.—Trains on the northern division are now running to Childwold station, 99 miles south of Valleyfield, Que., the real northern terminus of the road. Trains from Montreal leave the Bonaventure station, Montreal, and run over the Grand Trunk to Coteau Junction and over the Canada Atlantic to Valleyfield and Malone. There is still about 20 miles of track to be laid on the middle section of the new road south of Childwold, and until this work is finished the trains will be run over the Rome, Watertown & Ogdensburg and Ogdensburg & Lake Champlain and over the Central Vermont, from Norwood to Malone.

Akron & Eastern.—About 300 men are now working on this road and several heavy fills and deep cuts have been completed and also some grading, but the work is not making as much progress as was anticipated when the grading was begun in July. The officers state, however, that the line will be graded between Akron and New Castle, Pa., 70 miles, by January next as previously announced.

Aransas Harbor Terminal.—J. P. Nelson, of San Antonio, Tex., D. M. Picton, J. W. Maddox are the incorporators of this company, referred to last week as organized to build a road from Aransas Harbor to deep water at Aransas Pass, 9¾ miles distant. About $60,000 has already been expended on the road bed, building trestles, etc., and 1,800 ft. of track is laid. The capital stock is $250,000.

Arcata & Mad River.—Surveys are being made for this road from North Fork to Cañon Creek, Cal., five miles. Andrew Corbell, San Francisco, is President, V. Zamba, Superintendent, and P. E. Herrick, Engineer, of Arcata, Cal.

Baltimore Belt.—It is expected to complete 5,405 ft. of the tunnel work on this line by Aug. 1. The length of the tunnel is 8,600 lin. ft. and the work will be entirely completed by January, 1893. The open work on the line in the northern part of the city will be finished by November next and the approaches to the tunnel by January next. The total length of the road is 7⅓ miles. Ryan & McDonald, the contractors, have about 800 men employed on the work. William Gilmore is President of the company and Richard Randolph, Chief Engineer.

Birmingham, Laney & Piedmont.—The contract for completing the construction of this road will probably be let in August and the company expects to complete the line between Laney and Peidmont, Ala., within the next three months. The distance is about 23 miles. About seven miles of the road near Laney, Ala., was completed last year and is now in operation. The work on the balance of the line will be light. J. C. Laney, of Laney, Ala., is President of the company.

Bonaventure & Gaspe.—Messrs. J. R. Wilson, J. A. Greenshields, Q. C.; Angus Thom, and other representatives of the Baie des Chaleurs Company, left Montreal last week for Pasbebiac. They expected to be joined at River du Loup by Hon. Messrs. Hall, Casgrain, Nantel and Mr. Walter Barwick, Counsel for the Ontario Bank. The party will make a tour of inspection over the road, with the object of recommencing operations and completing the line to Gaspé Basin, Que. This movement is the result of a legal compromise effected by Mr. Greenshields between Mr. Thom, the Cooper Syndicate and the Ontario Bank. From Pasbebiac to the Basin the projected route is said to pass through a rich petroleum district. Application for incorporation of the new company will be made under the title of the Bonaventure & Gaspé, and henceforward the road will be known by that name.

Brunswick, Western & Southern.—The Southport Construction Co. has been chartered by H. H. Dougherty and others to build this road between Wilmington and Southport, N. C.

Buckingham.—W. E. Gilliam and J. D. Davis, of New Store, Va., have sub-contracts for building part of the Rosney Iron Co.'s road from Arvon to Rosney, Va., 16 miles.

Burlington & Missouri River.—Dunley Bros & McShane have the contract for 12 miles of grading, from Buffalo Junction west and northwest six miles toward Sheridan, and six miles toward Buffalo. They began work last week.

Caldwell.—Grading has been begun on the extension beyond Essex Fells, near Caldwell, to Whippany, N. J., and about 75 men are employed; the work is being done by the company. It is stated by the officers that they expect to complete considerable work this year on the extensions to Morristown and Rockaway. Free right of way has been secured for a considerable part of the distance and agreements are being made for the balance.

Charleston, Clendennin & Sutton.—Worthington, Elliott & De Bardeleben, of Birmingham, Ala., have commenced tracklaying at Charleston, W. Va., along the Elk River. This firm is building 20 miles of this road to Clay County, work having been commenced in March last.

Chickamauga & Durham.—About 12 miles of track has now been built on this road from Chickamauga, Ga., and it is expected to complete the line next week. It is to extend from Chickamauga to the Durham coal mines and will be 18 miles long, connecting first with the Central of Georgia, and with the Chattanooga Southern at Durham, 5 miles west. At present about 300 men are employed completing the work. The maximum grade is 2½ per cent. and the maximum curve 16 deg. The only bridge work is a plate girder span 65 ft. long. S. F. Parrott, of Chickamauga, is President.

Columbus, Lima & Milwaukee.—H. A. Schwanecke, of Pittsburgh, has been appointed Chief Engineer of this road, and will run a new line between Columbus and Lima, O. It has been stated that tracklaying will begin at once on the line from Lima to Defiance, O., 43 miles, which was graded two years ago, but the appointment of a receiver last week may delay construction work.

Concord & Montreal.—The short branch from Jefferson station to Jefferson Hill, N. H., three miles, was opened for traffic on July 22. On the branch from Jefferson east to Berlin Falls it is stated that the track is now laid to within two miles of Gorham, N. H., on the Grand Trunk, and the balance of the track will be laid as soon as the bridges have been erected. The road has been graded the entire distance to Berlin Falls.

Denison, Bonham & New Orleans.—Maj. S. B. Wathen, Resident Engineer of the Texas & Pacific, was engaged last week with other engineers in making an inspection of the route between Denison and Bonham, Tex., 40 miles, which was graded a few years ago by an independent company. It has been rumored for a long time that the Texas & Pacific had purchased the company's charter and would complete the road to Bonham.

Duluth & Iron Range.—The work on the branch to the Mesaba branch is progressing satisfactorily now, and there will not be much delay beyond the time originally called for in the contract. The delay was on account of the wet weather.

Duluth, Mesaba & Northern.—About 12 miles of track has been laid north of Stony Brook, Minn., and the work will be completed to the Mesaba Range before Aug. 15.

Evansville & Richmond.—The Chief Engineer denies the current newspaper story that this road is to be extended very soon beyond its present terminus at Westport toward Richmond, Ind.

Forest City & Sioux City.—This road is now in operation from Forest City east to Gettysburgh, S. D., a distance of eighteen miles, connecting with the Chicago & Northwestern. J. J. S. Hassler, of Washington, D. C., General Manager, is said to be engaged in arranging for the extension of the line from Forest City, across the Missouri River, toward Rapid City.

Girardville.—The incorporation of this company by officers of the Pennsylvania was noted last week. The branch is to be placed under construction immediately, and will extend in a westerly direction from a point on the Shenandoah Branch of the Pennsylvania Schuylkill Valley road, at Shenandoah, through lands of Gilbert & Shaeffer, the Philadelphia & Reading Coal & Iron Co., and the Girard estate to Girardville, Schuylkill County, a distance of about five miles. This line passes, and will make connection with, the William Penn colliery, which is now shipping upward of 1,000 tons of anthracite coal daily over the lines of the Philadelphia & Reading system, which output will now be delivered over the lines of the Pennsylvania system by means of this new branch. It is understood that a new breaker will be erected at the William Penn mines, which will largely increase this tonnage. At these mines the celebrated Mammoth coal vein approaches the surface of the earth and is stripped for a long distance, showing a thickness of over 60 ft.

Goderich & Wingham.—A government subsidy of $99,200 has been appropriated toward the construction of this road via Port Arthur, 31 miles. It is said that this amount will be required to be supplemented by $150,000 from the municipalities through which the line will pass, and the promoters of the scheme will take up the question of municipal bonuses at once.

Iberia & Vermillon.—The contract for grading this branch of the Southern Pacific has been awarded to C. Kiel, of San Antonio, Tex. The contract for the tracklaying and ballasting will be let later. The branch is 15 miles long and is to extend from New Iberia west to Abbeville, La. The maximum grade is 20 ft. to the mile and the maximum curvature 2 deg. The road is to be built by the Pacific Improvement Co., and will be operated as a branch of the Southern Pacific. E. B. Cushing, of Houston, Tex., is the Constructing Engineer and I. A. Cottingham, of New Iberia, is Assistant Engineer.

Illinois.—Articles of incorporation have been filed at Springfield, Ill., by this company. It is proposed to construct a line from Chicago to Rock Island, with a branch from Chicago to a point on the eastern boundary of Illinois at or near the southern boundary of Cook County. The capital stock of the company is $4,000,000. The incorporators are James C. Caldwell, George F. Watson, John C. Reynolds, Edwin L. Waugh and William Dallin, all of Chicago.

Jacksonville, St. Augustine & Halifax River.—The grading is reported to have commenced south of Titusville, Fla., and this line will probably be continued to Rock Ledge. Contractor Campbell has also begun work at Hardeeville, and proposes to work north to meet the force grading south of Titusville. This is a further extension of the line south of Daytona, which was placed under contract several months ago.

Joliet, DeKalb & Northern.—Most of the right of way from Joliet to DeKalb, Ill., has been secured and the balance is now being closed up. The company was incorporated in February and most of the preliminary work of the organization has been completed and detailed estimates have been made of the cost of constructing and equipping the road. Arrangements to secure the money to build the line are reported to be "progressing satisfactorily." The road is to extend from Joliet west to Newark and Millington, and thence north to DeKalb, a distance of 56 miles. There will be three iron bridges on the route, 500 ft., 450 ft. and 200 ft. long,

respectively. L. Soule, Rookery Building, Chicago, is General Manager.

Kansas City, Nevada & Ft. Smith.—L. J. Smith, of Kansas City, was awarded the contract last week for work on the extension south of Hume, Mo., and it is proposed to build as far south as Pittsburgh, Kan. It is stated that the contractor is to build over 50 miles of the line and the work placed under contract is to be completed in two months. The extension to Pittsburgh will be about 112 miles long, and will reach the lead and zinc mines of southwest Missouri and the coal fields of south eastern Kansas.

Kansas City, Pittsburgh & Western.—A charter for this company was filed in Kansas last week by C. L. Martin, of Kansas City, and other directors of the Kansas City, Nevada & Fort Smith, of which the new road is to be an extension. It is to start from a point on the state line in Crawford County, near Pittsburgh, connecting with the extension located to that point, and thence westerly through the southern tier of counties in Kansas to the Arkansas River, in Cowley County, 250 miles. It is stated, however, that there is no intention of building beyond Pittsburgh. The charter covers the line to that point.

Kentucky Midland.—The surveys recently reported as being in progress from Frankfort southeast about 70 miles, to connect with the Louisville Southern, were made for an extension of this road. Surveys have also been made for an eastern extension of the line from Paris to Mt. Sterling, 23 miles.

La Porte, Houston & Northern.—The grading has now been completed, except for a short distance, from La Porte on Trinity Bay to within five miles of Clinton. The work near Clinton is being delayed by a right of way dispute, but the contractor has begun work north of Clinton with a large force and will soon have the line graded to Houston about 20 miles from La Porte.

Long Island, North Shore Branch.—A charter for this company has been filed recently by officers of the Long Island. The new road is to be an extension of the present line along the north shore of Long Island, and will extend from Port Jefferson to Manor. The capital stock is placed at $120,000. The distance of the road is 12 miles, and the route has been already surveyed. Work will begin immediately.

Mexican Interoceanic.—A local paper states that the work of construction on the Pueblo and Acapulco branch is going forward in a satisfactory manner, and it is believed the road will be completed to Chietla, Mex., from Matamoras Izucar in August.

Mexico, Cuernavaca & Pacific.—Charles Wheeler, of Denver, Col., secretary of the company, states that the construction work is progressing rapidly, and that within 90 days the line will be finished and in operation from the City of Mexico to Contreras, a city of about 6,000 inhabitants, which is about 18 miles from the capital.

Midland Pacific.—This company has been recently reorganized, as already noted, and new directors, including several eastern bankers, have been elected. The officers state that probably 100 miles of the road west of Sioux Falls, S. D., will be graded this year. No contracts have yet been let. The line has been definitely located through South Dakota, crossing the Missouri River at Pierre, and a preliminary survey has been completed, writes an officer, through to the coast. The grading on the Dakota division which it is expected to begin this year is principally open prairie work ranging in quantities from 15,000 to 20,000 cu. yds. to the mile. The maximum grades will be 32 ft. and curvature three degrees. West of the Missouri River, which it is proposed to bridge at Pierre, there will be heavy earth work and some rock work. S. L. Tate, of Sioux Falls, S. D., is President, and J. C. Barton, of Chamberlain, S. D., is Chief Engineer.

Missouri, Kansas & Eastern.—Twenty-eight miles of the track on this road have now been completed, 12 miles of the work having been laid in 1892, six miles in June and six in July. The first 16 miles is situated in St. Charles County, on the old Cleveland, St. Louis & Kansas City road, and was built in 1888 by that company.

Missouri, Kansas & Texas.—Vice-President Waldo states that the company has decided to build this year two lines, one from Boggy Tank east to Houston, Tex., about 80 miles which is being located; the second from Smithville west to Lockhart, 36 miles, to connect the branch being operated between San Marcos and Lockhart with the main line. The contracts for both lines have been let to Burkett, Burns & Co. This is the only construction work which will be undertaken in Texas this year.

Nampa Railway & Construction Co.—A party of engineers under T. D. Babbitt, of Nampa, Idaho, Chief Engineer, began a new survey for this line last week from Silver City north via De Lamar to Nampa, west of Boise City, a distance of about 40 miles. The work is being done under the supervision of Maj. C. I. Wickersham, who has an office in the Rookery Building, Chicago. Major Wickersham represents the interests of capitalists who have agreed to build the road if the report of the engineers is favorable to its construction. J. M. Jones, of Nampa, Idaho, is one of the local directors.

Nanticoke & Newport.—This company was chartered in Pennsylvania last week to build a road from Nanticote to Glen Lyon, Luzerne County, eight miles. The capital stock is $50,000. Thomas D. Shea, of Nanticoke, Pa., is President.

Nashville & Knoxville.—Nine miles of track is reported to have been laid on the extension east of Cookeville, Tenn., and it is also stated that the road will be completed to Standing Stone, Tenn., a distance of 16 miles, by Nov. 1.

Nebraska Central.—The survey for the line beyond Council Bluffs was begun last week by Chief Engineer Kimball and C. W. Boyden, Division Engineer. R. H. Lawrence, of Omaha, with a party of 11 men is reported to be surveying the line southwest from Port Dodge, which will meet the survey northeast of Council Bluffs, which has just been begun. J. H. Dumont, of Omaha, is President.

New Roads.—T. P. Murray, of Salt Lake City, who had surveys made in the spring for a line west through Stockton, Utah, to the Deep Creek mines, went over the route last week, accompanied by Messrs. Long and McConnell, civil and mining engineers, and Mr. Hawthorne, an attorney, all of St. Paul, who are supposed to represent an Eastern company that is considering the building of the road.

The Crozier Iron Co., of Pulaski, Va., has begun the survey for a five-mile road from Carter's Ferry, on Cripple Creek, to limestone quarries.

The Quitman Lumber Co., which is interested in the proposed road from Quitman northwest to Moultrie, Ga., a distance of about 25 miles, has agreed, it is reported, to begin construction in August.

Paul D. Barr, an engineer of Jacksonville, Fla., has charge of the engineering party which is making the survey from Jacksonville north to Savannah, Ga. It is variously reported that this survey is being made for an extension of the South Bound and for several Florida roads, but these statements do not seem to be based on any good authority.

W. S. Graham, of Auburn, Cal., is surveying a narrow gauge road through Eldorado County from a point in the eastern part of the county to the American River above Georgetown. The new road will open up new lumber lands, and it is proposed chiefly as a logging road.

The citizens of Mount Holly, N. J., are making an effort to induce the Philadelphia & Reading to build a branch railroad from Camden to Mount Holly, 20 miles. That company, however, is not willing to make a more definite agreement than that it will operate the road if sufficient stock is subscribed to build it. The cost of construction is estimated at $20,000 a mile.

H. S. Joseph, of Salt Lake City, has just completed the reconnoissance of a line from Salt Lake City via Lookout and Clover Creek to Stockton, Utah, the southern terminus of the old Utah Central. The surveys were made for Simon Bamberger, of Salt Lake City, who announces that it is his purpose to build a road to the Deep Creek mines near the Nevada state line.

Northern Pacific.—Bids were recently offered at Tacoma for filling in nearly 400,000 yards of earth under trestles on the Cascade and Pacific Divisions and on its Seattle branch. Contractors Rybeig, Peters & Greenough received the contracts for the work between Tacoma and Pasco and contractor Nolan those on the Seattle branch.

The revision of the location of the main line near Granite and Algoma, Idaho, involving the construction of 14 miles of new track, is now practically completed; the only work remaining to be done is a long iron viaduct, which will soon be finished. J. R. Marks & Co., of Spokane, Wash., were the contractors.

North Galveston, Houston & Kansas City.—Bids are being received to build and equip this road, recently incorporated, from a point in Galveston to Virginia Point, Tex., a distance of 16 miles. Walter Gresham, of Galveston, and others are the incorporators.

Old Colony.—The company has begun work on its third and fourth tracks to be constructed between Boston and Braintree. Work is being prosecuted in the cut between Crescent avenue and Savin Hill and the bridge at the latter point will soon be widened. The completion of the cut and bridge work at Savin Hill, the widening of "Little Neck" bridge at South Boston, and some easy filling between Savin Hill and Harrison square will make three tracks immediately available between Boston and Harrison square.

Surveys are being made for a line from Sherborne to Roslindale, Mass., connecting the northern division with the Dedham Branch.

Pennsylvania.—The Minersville branch of the Pennsylvania Schuylkill Valley from Pottsville to Primrose Summit, 7¼ miles, is about completed and will be placed in operation this month. This branch, in addition to reaching the large breaker of the Lytle Coal Co. at Primrose Summit, has a spur connection into the yards of the Pottsville Iron & Steel Co., at Pottsville, Pa. The Pottsville end of this work was exceedingly expensive, as it is elevated almost through the entire distance of the Norwegian addition at an elevation of about 25 ft. above the surface of the ground. A very complete description of this branch was published on page 537, July 15.

Philadelphia Belt Line.—An amicable agreement has been reached with the Pennsylvania, the lessee of the Kensington & Tacony road, regarding the grade crossings in the northern part of Philadelphia, which have been the cause of many disputes and constant litigation. At the southern end of the line connection has been made with the Baltimore & Ohio road at Meadow street, and a switch is being laid to join the Belt Line and Pennsylvania tracks at Swanson street.

Philadelphia & Frankford.—Nolan Bros., of Reading, Pa., have the contract to build the Reading's Frankford branch and have a large force of men at work on the western end of the line, at Crescentville, where the line connects with the Philadelphia & Newtown branch. This point is about two miles and a half from Frankford. For some time work will be confined to an 18 ft. cut through a ridge a little distance east of the Newtown road, as stated last week. The Newtown branch tracks will be used from near Crescentville to a joint distance above Olney Station, about a mile further south. There the road will branch off to the west and run to Logan Station, on the Reading's New York branch, thus giving the Philadelphia & Newtown branch, as well as the Frankford branch, connection with the new terminal at Twelfth and Market streets, Philadelphia.

Philadelphia & Reading.—The work of securing the right of way for the proposed branch from Exton to West Chester, Pa., near Philadelphia, was vigorously pushed forward this week, and it is hoped that all the right of way will be secured so that the line will be built this fall. It may also be extended to connect with the Pickering Valley Railroad at Chester Springs.

Port Arthur, Duluth & Western.—James Conmee, one of the contractors, is authority for the statement that a contract with the Gunflint Lake Iron Co., of Minnesota, was signed last week whereby the company agrees to extend its road to the international boundary and extend it four miles on the Minnesota side to the iron mines at once. The company is to ship 100,000 tons of iron ore over the road yearly to Port Arthur, Ont.; 10,000 tons are to be shipped this year, beginning Oct. 31. The contractors have 600 men on the uncompleted section of 20 miles to the boundary, and will at once increase the force and rush the work. They will also increase the rolling stock to handle the ore.

Poughkeepsie Bridge & Railroad Company.—A charter for this company was filed at Albany, N. Y., last week, the capital stock being $5,000,000. The road is a re-organization of the Poughkeepsie Bridge Co., and the Central New England & Western railroad will also be merged with the new company. The property is controlled by the Philadelphia & Reading which is now operating it, and the officers state that the traffic which that company will send over the route alone assures the payment of the full guaranteed interest.

St. Paul & Duluth.—The reduction of grade at Brown's Hill, near Pine City, has been about completed, and the company will soon commence work reducing the Stacy Hill. New rails are now being laid south of Hinckley, Minn., and, when this work is completed it is probable that there will be a further reduction in the running time of the "Limited" between St. Paul and Duluth. This train now makes the run in 4½ hours, and there is reason to believe that the time will be reduced to four hours as soon as the roadbed is in shape. The distance is 156 miles.

Salt Lake & Los Angeles.—The name of the Saltair road has recently been changed as above. The company has nearly completed its line to Saltair Beach on the eastern shore of Great Salt Lake, about 15 miles from Salt Lake City. All the track will be laid in a very short time. The grade to the lake is almost level. The company proposes to make extensive improvements at the lake and build a bathing resort which will not be completed until next year. The officers state that they will then begin a long western extension from the present terminus of the road.

San Francisco & Great Salt Lake.—E. L. G. Steele, of San Francisco, one of the directors, speaking of the work now being done by the company, said last week that the directors have decided to put additional locating engineers in the field and to push the engineering work. He also added "that the line from San Francisco to Stockton has been practically located, although the termini have not yet been selected." The directors expect that $3,000,000 of the company's stock will be subscribed in San Francisco.

San Jose & San Francisco Transportation.—The company will shortly commence to build a standard-gauge road 15 miles in length from Alviso to San José, Cal., with a wharf at the former town. W. R. A. Johnson, a director, says that he hopes to have the road completed in 90 days, the material and part of the equipment being on the way from the East to San Jose, and 95 per cent. of the right-of-way having been secured. The directors of the road are V. Cock, J. H. Russell, Mitchel Phillips and James Leitrich, all of San Jose.

San Luis & San Joaquin.—A charter has been filed under this name to build a road of 10 miles from San Luis Obispo, Cal., in a northerly direction along the most feasible route to a point near El Moro, on Moro Bay. This line is to be a branch of the proposed line from the coast in San Luis Obispo County to Bakersfield and the San Joaquin Valley. This project was organized in the spring at a convention at Bakersfield, attended by delegates from Tulare, Fresno and Kern Counties, and has been described in these columns.

Scottsboro & Guntersville.—Grading was started on this road last week by J. A. Neville, of New York, who has the contract to complete the entire road. The right of way has just been secured by Col. Thomas Fitch, of Scottsboro, Ala. The road will extend from Scottsboro, on the Memphis & Charleston, to Guntersville, a distance of about 50 miles. It will parallel the Tennessee River nearly all the way. Its completion will form a through line from Attalla to Scottsboro. J. T. Morgan is Superintendent of Construction.

Sioux City, Washington & Baltimore.—The surveyors have completed the location of a line to Anthon, on the Little Sioux River, 30 miles east of Sioux City. An easy grade out of Sioux Valley has been secured. The directors will ask Sioux City to subscribe to the stock of the company.

Spokane Falls & Northern.—This company is now extending its road about three miles beyond its present terminus at Little Dalles, Wash., north along the Columbia River to Northport.

Southern Iowa.—This company owns a road from a connection with the Chicago, Burlington & Quincy near Ottumwa, Ia., north to the town of Keb in Wapello County, about five miles of track, and also from a connection with the Iowa Central near Eddyville, Ia., east to the town of Pekay in Mahaska County, about four miles of track, which was built in 1892. No new road is at present under survey or contract.

Tennessee & Coosa.—A. N. Nichols & Co., who built the line into Guntersville, Ala., also have the contract for the section from Huntsville, south to Hobbs Island, on the Tennessee River, a distance of 14 miles. The grading has already been begun.

Toledo, Columbus & Cincinnati.—The local papers report that the engineers have just completed a survey from Kenton, south to Columbus, O., a distance of 52 miles. This, however, is of very little importance. Surveys were made as far as Columbus in 1889, when the line was being built to Kenton. A recent letter from one of the officers states that there is no probability of any work being done this year on the extension.

Toronto Belt Line.—The Grand Trunk will begin the operation of this belt line on the western and northern sides of Toronto, Ont., on July 30. The road begins near Eglinton avenue connecting with the northern and western divisions of the Grand Trunk over which trains will be run into the Union station. The new road extends to Yonge street and thence through Mount Pleasant Valley and Moore Park to the Don River Valley.

Toronto, Hamilton & Buffalo.—At an election at Brantford, Ont., on July 21, a by-law granting this company a subsidy of $70,000 to aid in building the road to that town was carried by a majority of 247 votes.

Trinidad & San Luis Valley.—The location of this line has now been completed for 11 miles from the summit of Costillo Pass toward Stonewall, Col. The road is to extend from Trinidad via Stonewall, to Costillo Pass and the San Luis Valley, and will be built mainly by the Board of Trade of Trinidad, Col. The survey was begun a few weeks ago by John E. Mchon, of Trinidad, Chief Engineer. The maximum grade will be 105 ft. to the mile and the maximum curvature 12 degrees. The work will be very difficult on parts of the line. The contract has not been awarded, but will probably be let to J. R. DeRemer & Co., of Denver, Col.

Unadilla Valley.—The contract for building the road through the Unadilla Valley, New York, has been signed and accepted, and the construction company promises to commence work in August. D. E. Culver, No. 145 Broadway, New York City, is Chief Engineer.

Union Transfer & Exchange.—A charter for this company was filed in Pennsylvania last week. The road is to extend from a point near the village of Library, in Snowden township, Allegheny County, to a point near

Layton station, Lafayette County, Pa. The length of the road is about 22 miles. The capital stock is $250,000. James B. Oliver, of Pittsburgh, Pa., is President.

Woodstock & Centerville.—Lawlor, Connor & Co., of St. John, N. B., have received the contract to build 20 miles of this road from Upper Woodstock, N. B., north to Centerville, Carleton County. The work of construction will begin as soon as the right of way has been secured. A branch of six miles to the Maine State line, connecting with the proposed Bangor & Aroostook road, has been subsidized by the Dominion Government, and will probably also be built by Lawlor, Connor & Co.

Yankton, Norfolk & Southwestern.—N. W. Gifford, of Yankton, S. D., one of the directors of this road, has made a proposition to the Commercial Club of Sioux Falls, S. D., to extend the road northeast from Yankton to Sioux Falls, a distance of 60 miles. The grading to Norfolk, Neb., will be completed by Sept. 1.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—The directors have declared the income bond conversion plan of its circular No. 68 effective and have extended the time for depositing bonds for conversion to Sept. 1.

Buctouche & Moncton.—The portion of this road north of Moncton, N. B., situated in Westmoreland County, N. B., about 15 miles long, has been sold by the Sheriff under an execution. It was bought for Clarke & Co., bankers, Philadelphia. The other section of the road to the northern terminus at Buctouche, 32 miles from Moncton, will also be sold this week.

Chicago & West Michigan.—A special meeting of the shareholders is called for Aug. 16 to authorize the purchase of the stock of the Chicago & North Michigan and to authorize the increase of $725,000 capital stock for this purpose. The new road is finished and being operated; 90 per cent. of the subscription to build has been paid. When subscription was made the right was reserved to issue Chicago & West Michigan stock in lieu of stock of the new road.

Columbus, Lima & Milwaukee.—John Blythe, of Crawford County, has been appointed Receiver of this road from Columbus to Defiance, O., by Judge Ricks, of the United States District Court at Massillon, O. The order was made upon application of the Receiver of the Lima National Bank and grew out of suit now pending by the bank against the Atlantic Trust Co. and the New York Construction Co. The bank holds $60,000 of the company's bonds, interest upon which has been defaulted.

Cornwallis Valley.—This road which extends from Kentville to Canning and Kingsport, in Cornwallis County, N. S., has been purchased by the Windsor & Annapolis. The transfer was made this week.

Houston, East & West Texas.—The Supreme Court this week decided the motion of some of the mortgaged bondholders of the company for an injunction restraining a sale of the road under foreclosure set for Aug. 2, at Houston, Tex. The court decides that the bondholders should have applied to the Texas courts for the injunction. The company has been insolvent since 1885.

International & Great Northern.—It is stated that the stockholders have taken all the steps necessary to authorize the new third mortgage, and it is expected that the new bonds bearing the reduced rate of interest on the second mortgage bonds will be ready for delivery next month. The receivership of the railroad terminated July 12, and the plan of reorganization was practically perfected and consummated last January, but necessary legal formalities remain to be arranged.

Louisville, New Albany & Chicago.—The directors have decided to sell the remaining $2,400,000 of new stock at $25 per share to stockholders of record on July 30. The new stock is part of the issue of $5,000,000 authorized at the special stockholders' meeting last November, and of which $3,200,000 was then sold at the same price. The proceeds of the stock will be used to increase the facilities of the road and improve its plant.

Macon & Atlantic.—An order has been issued by the Georgia Supreme Court for a new sale of this road, the reserved price being $500,000. The property was offered in May under foreclosure proceedings, but no bids were offered. Nearly 100 miles of the line has been graded between Sofkee and Pineora, Ga., north of Savannah, but the work is in disconnected sections. The longest continuous section of grading is on the 75 miles west of Pineora.

Macon & Northern.—Jeptha Rucker, of Athens, Ga., was appointed Receiver of the company at Atlanta July 27. The application was made by a New York bondholder. The receivership is in the interest of the Richmond & Danville, which is joint lessee of the road with the Central of Georgia.

Memphis & Charleston.—Henry Fink, having been appointed Receiver at Knoxville, Tenn., July 14, by order of the United States Circuit Court, has taken possession of the property. H. C. Wilton will act as Treasurer and T. D. Flippen will act as Auditor, with office at Memphis.

Judge Howell E. Jackson, of the United States Court, on July 25 appointed C. M. McGhee, of Knoxville, joint Receiver with Henry Fink of the road. The minority stockholders had applied for the appointment of a permanent Receiver appointed representing their interest.

Northern Pacific.—The company has arranged with several banks of New York City to extend its floating debt for another year. It is said to be upward of $8,000,000, but about this the company refuses to give any particulars. It is said that the new floating debt notes bear six per cent. interest and that they are secured by a deposit of Chicago & Northern Pacific five per cent. bonds and other Northern Pacific treasury certificates.

Ogdensburg & Lake Champlain.—The meeting of the stockholders which had been called for this week to ratify the consolidation was prevented from acting by an injunction secured by a stockholder. President Smith, of the Central Vermont, says that the injunction against the consolidation with the Central Vermont is apparently a speculative move. He says: "The injunction is only temporary. The plan can practically be carried into effect by a vote of the Central Vermont stockholders. A meeting for that purpose will be held in two weeks."

Pennsylvania.—The statement of the business of all lines of the Pennsylvania for June is as follows: All lines east of Pittsburgh and Erie for June, 1892, as compared with the same month in 1891 show an increase in gross earnings of $152,180; an increase in expenses of $346,311, a decrease in net earnings of $194,131. The six months of 1892 as compared with the same period of 1891 show an increase in gross earnings of $1,220,041, an increase in expenses of $1,370,688, and a decrease in net earnings of $150,647. All lines west of Pittsburgh and Erie for June, 1892, as compared with the same month in 1891 show an increase in gross earnings of $193,264, an increase in expenses of $265,151, and a decrease in net earnings of $71,887. The six months of 1892 as compared with the same period of 1891 show an increase in gross earnings of $2,428,795, an increase in expenses of $2,235,283, and an increase in net earnings of $193,512.

Providence & Springfield.—The stockholders at a meeting on July 26 ratified the lease of the road to the New York & New England.

Queen Anne & Kent.—A judgment was rendered in the State Circuit Court last week for $205,000, in favor of the Philadelphia, Wilmington & Baltimore, to indemnify that company for expenditures made in improving the roadbed. It already owns 52 per cent. of the capital stock, and the present judgment is preliminary to the reorganization of the road.

Union Pacific.—The statement for May shows a gross decrease of the entire system of $18,512, but operating expenses were reduced $33,048, leaving a net increase of $14,536. The Oregon Short Line & Utah Northern and the Oregon Railway & Navigation lines continue to make poor exhibits. The report of the entire system, and of various divisions, is as follows:

OREGON SHORT LINE & UTAH NORTHERN.

Month of May:	1892.	1891.	Inc. or dec.
Gross earnings.....	$585,709	$616,765 D.	$31,056
Operating expenses.	365,134	441,756 D.	75,622
Surplus.....	$220,574	$175,708 I.	$44,866
Since Jan. 1:			
Gross earnings.....	$2,626,843	$3,039,784 D.	$412,941
Operating expenses.	1,732,597	1,916,100 D.	183,502
Surplus.....	$894,245	$1,123,684 D.	$229,438

UNION PACIFIC, DENVER & GULF SYSTEM.

Gross earnings.....	$511,690	$474,462 I.	$37,227
Operating expenses.	389,344	336,302 I.	53,041
Net earnings.....	$122,346	$138,160 D.	$15,814
Since Jan. 1:			
Gross earnings.....	$2,199,917	2,011,965 I.	187,951
Operating expenses.	1,815,614	1,638,397 I.	177,216
Net earnings.....	$384,302	$373,598 I.	$10,734

UNION PACIFIC SYSTEM PROPER.

Gross earnings.....	$3,260,373	$3,344,283 D.	$83,910
Operating expenses.	2,251,096	2,314,812 D.	62,715
Net earnings.....	$1,008,276	$1,029,471 D.	$21,194
Gross earnings	$15,320,743	$15,468,019 D.	$147,276
Operating expenses.	10,735,801	10,828,712 D.	92,907
Net earnings.....	$4,584,938	$4,638,306 D.	$54,368

GRAND TOTAL OF UNION PACIFIC SYSTEM.

Gross earnings.....	$3,400,914	$3,419 426 D.	$18,511
Operating expenses.	2,359,029	2,392,077 D.	33,048
Net earnings.....	$1,041,885	$1,027,348 I.	$14,537
Gross earnings.....	$16,057,860	$15,912,622 I.	$145,237
Operating expenses.	11,238,309	11,257,523 D.	19,213
Net earnings.....	$4,819,550	$4,655,098 I.	$164,451

Valley (Ohio.)—The Receivers, J. H. Bole and H. M. Keim, of Cleveland, O., have given notice that they will supply to the United States Court for power to issue Receiver's certificates to repair and properly equip the road and build a new station at Cleveland. One of the Receivers states that the amount which they will ask to be authorized to issue will be $500,000. It is stated that bondholders representing $1,000,000 of the bonds have decided to oppose the application. Receiver Bole has answered their objections in a very vigorous manner in a newspaper interview. He states that a careful inspection of the road has been made and a detailed report of its condition shows that the line must be rebuilt between Cleveland and Akron, 36 miles. He also states that many of the ties are rotten, the bridges in a dangerous condition and many of the locomotives are only fit to be scrapped, and both passenger and freight cars need rebuilding, and the company has no facilities for repair work. Freight is delayed because of the lack of side tracks and about $1,800 a month is paid to foreign roads for the use of cars. Nearly $170,000 is due in unpaid bills.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, July 25.

The Western Passenger Association has had several meetings to take action upon the notice of the Santa Fe that it would make a rate of $12 for the Conclave of Knights Templar at Denver. The Santa Fe gave notice to the Western Traffic Association, under date of May 2, that it would make this rate, alleging in justification of its action that competitors had been illegally making rates much lower than the established rate of $28.15 and giving concessions which reduced the established rate to $12. The road has taken the same position in the Western Passenger Association, and seeks to justify its action on the ground of violation of the agreement by outside lines, meaning thereby the Alton. The Alton claims that it has not cut the rate but only contracted in advance for some of the business.

If the Chicago & Northwestern persists in its intention of reducing the lumber rates from all points affected by the reduction of three cents per 100 from Eau Claire, Wis., ordered by the Interstate Commerce Commission it will result in demoralization of rates on this commodity not only from the white pine region in the Northwest, but also from the yellow pine region of the South. The rates are now being checked out by the lines in the Western Freight Association and it looks as though they would go into effect. The Milwaukee & St. Paul conformed to the order of the Commission, reducing its rate from Eau Claire from 21½ cents a 100 lbs. to 18½ cents to the Missouri River. Notwithstanding the Northwestern has all along endeavored to maintain the position that to reduce the Eau Claire rate would force corresponding reductions from all other points, thereby nullifying the advantage obtained by Eau Claire, it seems hardly credible that it can persist in its intention and thereby sacrifice not only its own revenue but the revenues of all the other lines, in defense of a position which the Commission has declared not well taken.

Affairs in the territory of the Chicago & Ohio River Traffic Association are not mending yet, but there is some prospect of a meeting of the general managers being called soon to endeavor to reach a new agreement which will again restore the passenger rates, which have been forced down by the action of the Pennsylvania.

Eastbound grain rates are still unsettled. The Vandalia gave notice of its intention to reduce the rate from St. Louis to the seaboard to a 20 cent. basis, but at a meeting of the Central Traffic lines last week the Pennsylvania stated that it would not be a party to the proposed reduction. This being so the Vandalia will be unable to put the rates into effect, and the meeting adjourned after resolving that the rates should not be reduced. Rumors are current that the Wabash proposes making a similar reduction, but it is probable that its action was contemplated contingent upon the reduction by the Vandalia, and if the latter is not made it will not put it in effect.

The Central traffic lines will join the western lines in their "Homeseekers'" excursions, provided the latter will join the eastern lines in eastbound "home visitors'" excursions Sept. 20 and Oct. 11 and Nov. 1 from southwestern points. There was considerable trouble last year about this matter, and there may be some friction again this year.

Officials of the Atchison are reported as saying that that line has not abandoned its intention of reducing the second class rates to Pacific Coast points, but that the importance of the matter renders it advisable that it be submitted to a vote of the directors. It looks as though it was using the notice as a club, and is in hopes that it will not be compelled to strike the blow.

The Burlington has given notice to the President and members of the Western Traffic Association of its withdrawal from the Association. As the date of the notice will not allow the withdrawal to become effective until after the next meeting of the Advisory Board in October, it is not improbable that affairs may take such a shape in the meantime that it may be withdrawn.

The indications are that some plan may be perfected before that meeting which will do away with the objections of the Burlington. Some are of the opinion that the officers are not serious in their intention, but I am inclined to think that they mean what they say, but that President Perkins may find the situation more to his liking and possibly become convinced that affairs are not really as bad as he seems to think, and that the other lines are disposed to treat his line fairly after all. It seems unfortunate that he was not present at the last two meetings of the Advisory Board, as his absence apparently gave rise to the suspicion that he did not wish to be there and fully explain the position of his line.

The Rock Island, under advice of its legal department, has taken the position that it has the right to carry out the intentions of the eastern lines in granting stopover privileges on return tickets from the Christian Endeavor Society and National Educational Convention. The Western Passenger Association recently adopted resolutions limiting the acceptance of these tickets to two days after being stamped at New York for return passage, and Chairman Caldwell holds that the Rock Island has no right to ignore the vote of the Association, notwithstanding the advice of its legal department.

The Central Traffic and Trunk lines have agreed to the request of steamship lines that no weights be inserted on joint export bills of lading for lumber, but that such consignments be weighed at the seaboard and that the charges be collected on the weights thus ascertained, and a clause to this effect is to be inserted in through rail and ocean bills of lading upon such conments.

Harvest excursions have been authorized by the Western Passenger Association Aug. 30 and Sept. 27 and Oct. 25 from the southwest at one lowest first-class fare.

Traffic Notes.

The Great Northern will on Aug. 1 inaugurate daily passenger service between St. Paul and Spokane, Wash.

The Chicago, Burlington & Northern is now running free chair cars on the limited, night, trains between Chicago and Minneapolis.

Of the above shipments 2,259 tons were flour, 23,649 tons grain and millstuff, 12,343 tons provisions, lard, etc., 11,377 tons dressed beef, 1,992 tons butter, 2,063 tons hides and 5,209 tons lumber.

The three Vanderbilt lines carried 37.7 per cent., the two Pennsylvania lines 20.6 per cent. The Lake lines carried 89,775 tons, against 83,401 tons during the preceding week, an increase of 6,374 tons.

The Chicago-Milwaukee lines have reduced the flour rate 2½ cents per hundred, making it 25 cents from Minneapolis to New York. It is said that the Lake Superior lines will make corresponding reductions. The general belief is that rates by the Northern routes have been cut for some time, and that the Chicago-Milwaukee lines have not had their share of the business.

The St. Louis Eastbound Traffic Association failed to take action on the eastbound freight situation, and especially the rate on sixth class freight to New York. The Vandalia announced a tariff on sixth class from East St. Louis on the basis of 20 cents from Chicago, all rail, which went into effect Wednesday. The Toledo, St. Louis & Kansas City and the Alton had signified their intention of meeting this rate, but at the meeting in St. Louis there seemed to be no disposition to take united action.

Chicago Eastbound Shipments.

The shipments of eastbound freight, not including live stock, from Chicago by all the lines for the week ending July 23 amounted to 62,240 tons, against 58,134 tons during the preceding week, an increase of 4,106 tons, and against 45,553 tons during the corresponding week of 1891, an increase of 16,687 tons. The proportions carried were:

Roads.	W'k to Ju'y 23.		W'k to July 16.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	7,705	12.4	10,108	17.5
Wabash.....	4,565	7.3	3,920	6.7
Lake Shore & Michigan South.	9,569	15.4	7,036	12.1
Pitts., Ft. Wayne & Chicago...	6,341	10.2	5,535	9.5
Pitts., Cin., Chicago & St. Louis	6,472	10.4	6,472	11.1
Baltimore & Ohio.....	2,913	4.7	3,139	5.4
Chicago & Grand Trunk.....	4,915	7.9	3,902	6.7
New York, Chic. & St. Louis...	6,173	9.9	4,762	8.2
Chicago & Erie.....	8,109	13.0	7,621	13.1
C., C., C. & St. Louis.....	5,479	8.8	5,649	9.7
Total	62,240	100.0	58,134	100.0

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MANUFACTURERS OF THE

WESTINGHOUSE AUTOMATIC BRAKE

The WESTINGHOUSE AUTOMATIC BRAKE is now in use on 24,000 engines and 325,000 cars. This includes (with plain brakes) 252,000 freight cars, which is about 23 PER CENT. of the Entire Freight Car Equipment of this country, and about 80 per cent. of these are engaged in interstate traffic, affording the opportunity of controlling the speed of trains by their use on railways over which they may pass. Orders have been received for 173,000 of the Improved Quick-Action Brakes since December, 1887.

The best results are obtained in freight train braking from having all the cars in a train fitted with power brakes, but several years' experience has proven conclusively that brakes can be successfully and profitably used on freight trains where but a portion of the cars are so equipped. Below is a graphical illustration of the progress made in the application of the Automatic Brake to freight cars since its inception.

Year.	No. per year.	Grand total.
1881	105	105
1882	1,085	1,190
1883	4,966	6,156
1884	15,051	21,207
1885	10,410	31,617
1886	8,946	40,563
1887	9,281	49,844
1888	27,696	77,540
1889	26,065	103,605
1890	50,502	154.107
1891	39,061	193,168

193,168 freight cars fitted with the Westinghouse Automatic Brake, which is nearly 20 per cent. of the Entire Freight Car Equipment of this country.

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LOCOMOTIVE BRAKES.

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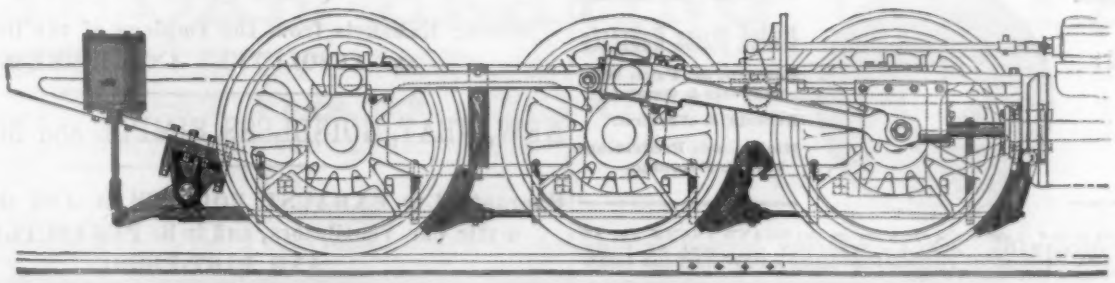
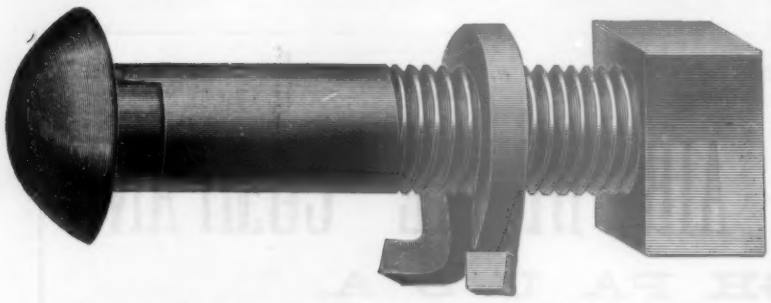


Standard Outside Equalized Pressure Brake, for two or more pairs of Drivers furnished to operate with either STEAM AIR or VACUUM.

THE "STANDARD" NUT LOCK



Manufactured under D. O. Ward's Patents by the

STANDARD NUT LOCK CO.,

NOS. 236-248 BANK ST., NEWARK, N. J.

SAMPLES FREE.

This nut lock is presented on its merits as the best and cheapest device for securing track joints.

It is a torsional loop made of good quality of tempered spring steel, having horizontally inclined foot pieces, which are curved inward, thereby greatly increasing the spring resistance and acting simultaneously; rests upon the base of angle bar, or underlying rail base in case of fish plate, preventing the loop portion from rotating and hammering down *thread of bolt.*

The nut lock for ⅞ bolt made of ¼ in. square steel, standard pattern, yields a tension of 4,300 lbs. on the bolt, which is sufficient to reduce the wear of the bearing surfaces of the angle bars on the rails, imparting, as it does, a uniform bearing the entire length of the bar.

The "Standard" Nut Lock has sufficient elasticity to maintain a tight joint, which cannot be truthfully said of many light-weight single coil washers.

The "Standard" Nut Lock is, in its superficial form, similar to an annular coil twisted out of plain, i. e., the curved shoulders or ends of the loop proper are spread in the usual manner of spring coils, at which bearing points the locking friction is equal to that of the best single coil washer, and added to this it is terminated in *inwardly curved* extensions, which must apparently furnish additional short leverage spring force of a torsional character.

Distinctive Merits of the "Standard" Nut Lock, Condensed:

Fixedness of position—cannot rotate and hammer down threads of bolt.

Cannot get one end into elongated slot of angle-bar.

Unlike any permanently placed, double washer, the Standard *is* interchangeable regardless of distance between bolts.

Cannot be put on wrong side out, as the outward projection of the foot pieces would prevent the nut being turned up.

Has more spring power directly under the nut than any two ordinary coil nut locks.

Being fixed in position, it offers double the locking friction of nut locks, which when in their *dead* "set" condition turn back with nut by the vibrative effect of passing train.

The "Standard" Nut Lock embodies the old principle of spring power improved by overcoming the objection to the double washer or nut lock, and covering the weak points of the single coil washer.

THE STANDARD COMBINATION TIE PLATE AND BRACE

POSSESSES THE FOLLOWING MERITS:

1. It prevents absolutely the canting of the rail into the tie, thereby greatly increasing the life of the tie.
2. It prevents the rails from spreading or canting over and wearing one side only.
3. The combination of the brace and plate obviates the necessity of spiking the rail and brace separately, thereby saving two spikes and securing the service of the *inside* spike for *holding* the rail; it also prevents the rail from working up and down, and laterally, thus making it impossible to wear the *neck of the spike.*
4. The plate and brace being made of malleable iron, is practically indestructible.

The tie plate and brace is especially useful for curves and guard rails, and also on bridges, whether the rail is laid on ties or on stringers. A tie plate without a brace will not save the head of the spike. A brace without a tie plate will not save the tie, and in a short time the rail will wear into the tie.

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For Use on All Kinds and Classes of Work.

Made for all sizes of bolts.

A trial is requested.

Samples free of expense.

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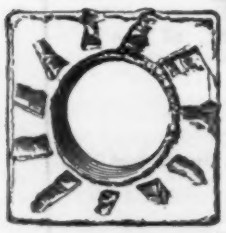
THE AMERICAN WASHER & MANUFACTURING CO.



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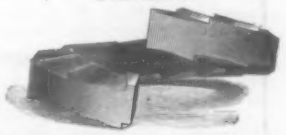
A Resilient Spiral Spring Washer with Ratchet-Shaped Teeth.

This is a positive lock, with spring temper, and will not cut thread of nut or bolt.

Patented.



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Excelsior Automatic Nut-Lock and Fish Plate Spring

These Nut Locks have been adopted by the New England Road-Masters, in Conventions held at Hartford, Conn., Oct. 19 and 20, 1887, and Boston, Mass., Aug. 15 and 16, 1888, as the best Nut Locks known.

Sample lots furnished for trial, free of expense, by forwarding the distance between centres of fish-plate bolts. Correspondence and orders solicited.

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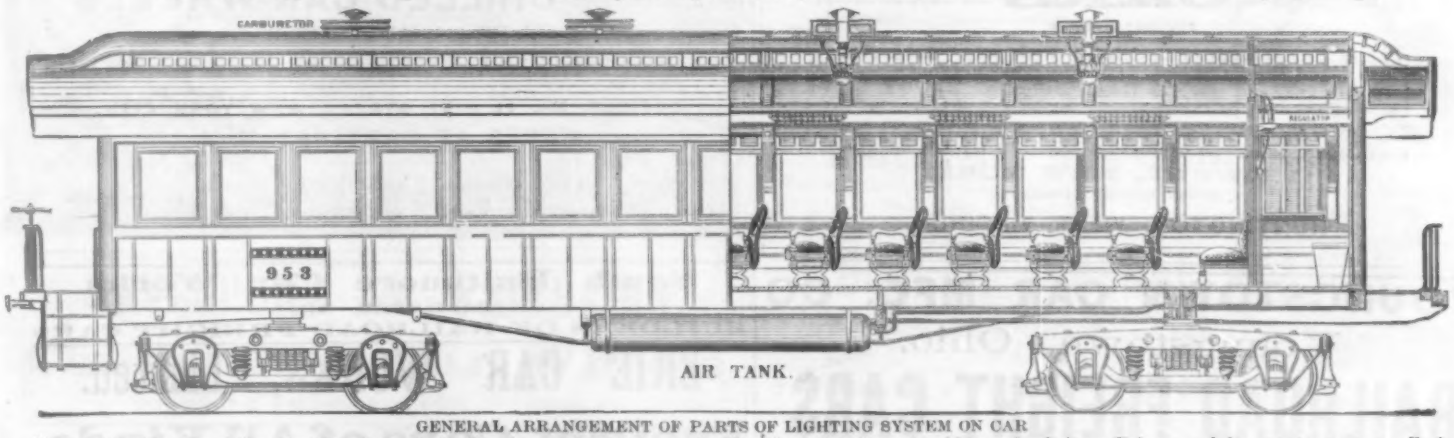

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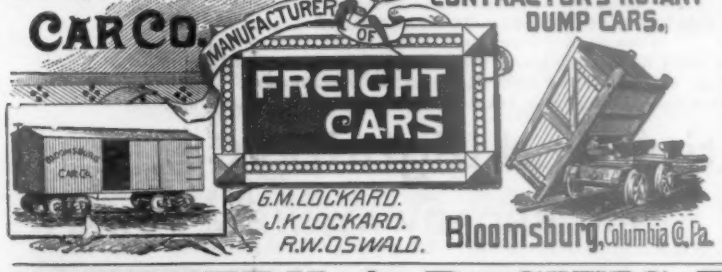

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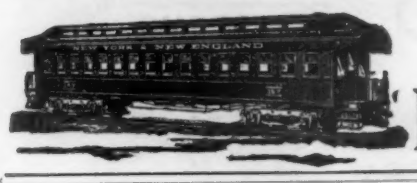

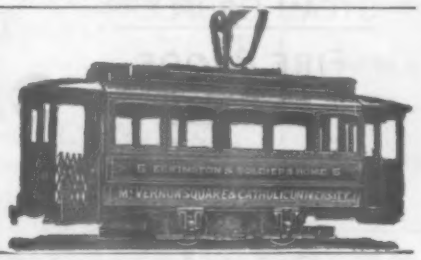

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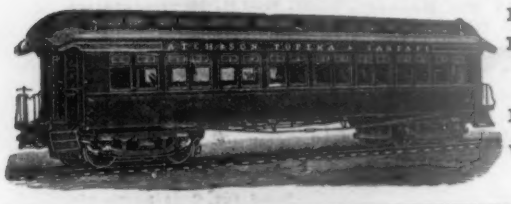

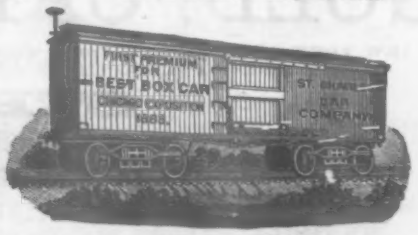

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Shoes should be ordered in accordance with the above allotment of territory.

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The following Popular Trains are furnished in whole or in part with our Superb Seating:

"Gilt Edge Limited."
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SPECIFY ONLY

"H. & K." SEATS.

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RAILWAY and MINE CARS.

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Enable railway cars to be started with but one-tenth the power required with ordinary brasses. Thirty (30) per cent. coal saving realized with trains of four or more cars. Journal heating entirely done away with by removing the cause. Cost of lubrication practically nothing, and every bearing guaranteed to yield 200,000 miles of service. Great economy and uniform reliability secured.

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DAVENPORT & FAIRBAIRN.

Chilled Iron Car Wheels.

Capacity, 350 WHEELS PER DAY. ERIE, PA.

Automatic Interchangeable Car Coupling Company,

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Solid Steel OR Malleable Iron, WITH *Steel Knuckle.*

Simplest, Strongest Best.

F. L. WELLS, General Agent,
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"THE SURVIVAL OF THE FITTEST."

Van Dorston Cushioned Car Coupling Equipment Co.

VAN DORSTON CUSHIONED CAR COUPLER.

M. C. B. TYPE.

Lightest, Strongest and Best. Automatic Self-Opening and Self-Adjusting. Insures Safety to Trainmen. Independent Double-Acting Gravity Lock. No Slack Required to Uncouple.

Also the **Van Dorston Single, Double and Triple-Acting Cushioned Draught Gear.** Seventy-five per cent. reduction in shocks on the part of the couplers and car bodies, and consequent great economy in repairs. Increase in yard room of from 12 to 18 cars per 1,000. Correspondence respectfully solicited.

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Automatic Freight Car Coupler.

Locomotive and Car Axles, Coupling Links and Pins.

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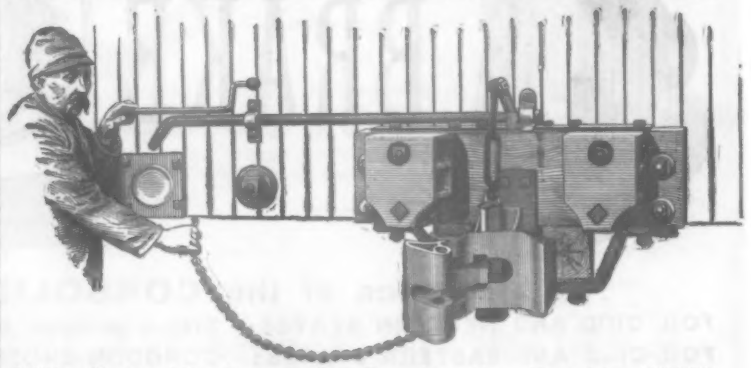
M. C. B. Passenger Coupler. Used in Place of Miller Hook Without Change in Platform.

Could Continuous Platform and Buffer.
Gould Vestibule.

STANDARD COUPLER.
(DOWLING TYPE.)
Drawhead, Malleable Iron; Knuckle, Pressed Steel; Pin, Drop Forged Steel.



With Chain Attachment for Opening the Knuckle WHEN REQUIRED.
THE STANDARD CAR COUPLING CO.,
New York Office, 45 Broadway. Chicago Office, 1018 The Rookery.

W. A. ALEXANDER, President. A. C. McCORD, Vice-President. H. O. NOURSE, Gen'l Agent. M. A. KILVERT, Sec'y. D. W. McCORD, Treas.

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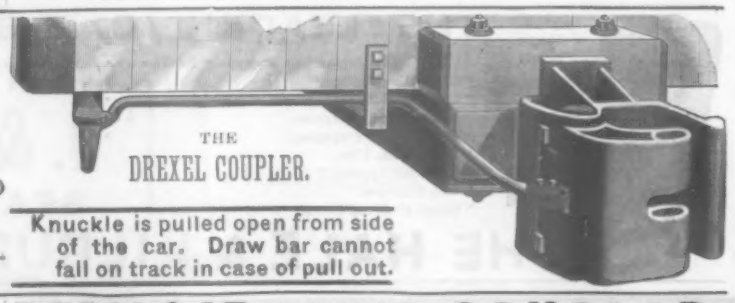
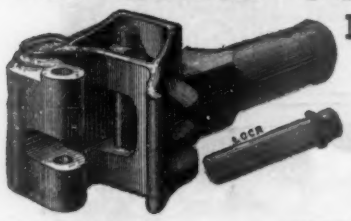
RAILWAY SUPPLY CO.
The DREXEL JOURNAL BOX LID
of Pressed Steel with a Central Bearing Spring. Cost of maintenance reduced to minimum with maximum efficiency.
The Rookery, - - - CHICAGO.
Eastern Office: COLUMBIA BUILDING, NEW YORK.



THE DREXEL COUPLER.
Knuckle is pulled open from side of the car. Draw bar cannot fall on track in case of pull out.

ST. LOUIS STEEL COUPLER,



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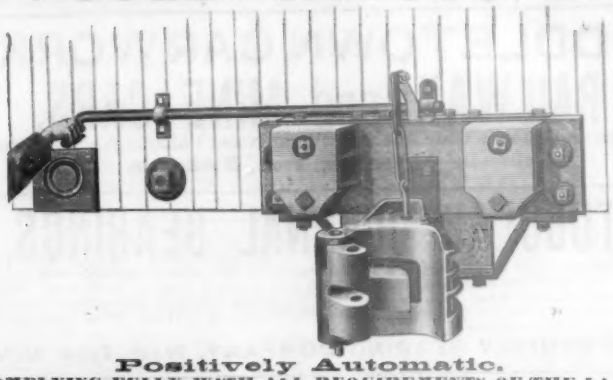
WM. V. WOLCOTT, President. HENRY O'HARA, Vice-Prest. GEO. A. BANNANTINE, Secretary.

SMILLIE DOUBLE LOCK COUPLER.

TENSILE STRENGTH (Fairbank's Test) 139,640. DROP TEST 700 lbs. hammer dropped 18 ft. 22 times failed to break the knuckle.
Direct drop of full sized pin makes a double lock formed by draw bar at "C" and Pin "D." Equally strong if pivot pin "A is lost. Should pin be lost, use any link—no chains being required. The strongest Knuckle and Coupler known. Cannot be unlocked by any jolt of the cars. Couples with all M. C. B. types. The locking pin drops behind the step on rear of Knuckle "K," and keeps the knuckle always open when cars are separated. Removing the pivot pins, 33 loaded gondola cars were drawn from Paterson, N. J., to West End (18 miles), the pull being entirely on the DOUBLE LOCK.
The drawbar is Malleable Iron. The Knuckle Pivot and Locking Pins steel.
THE SMILLIE COUPLER & MFG. CO.,
52 Broadway, New York. Works, 91 Clay St. Newark, N. J

THE POOLEY CAR COUPLER.



Positively Automatic.
COMPLYING FULLY WITH ALL REQUIREMENTS OF THE LAW.
SIMPLE. STRONG. EFFECTIVE.
PRATT & LETCHWORTH, MANUFACTURERS, BUFFALO, N. Y.

TROJAN CAR COUPLER.
M. C. B. TYPE.
THE STRONGEST AND THE ONLY SAFETY COUPLER.

The knuckle may be thrown open for coupling by the hand-rod at the side of the car, rendering it unnecessary for trainmen to go between the cars to open the knuckle. The action is positive, and not dependent on springs or gravity.
The lock has a bearing of four square inches on the knuckle.
N. O. Olsen, Engineer of Fairbanks & Co.'s testing department, says: "IT IS THE STRONGEST COUPLER NOW IN THE MARKET
THE TROJAN CAR COUPLER CO.,
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PHOSPHOR BRONZE
IN INGOTS AND CASTINGS.
LEAD LINED CAR BEARINGS
A SPECIALTY.
Brass and Phos. Bronze Castings from ¼ lb. to 5,000 lbs. in Weight.

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The Hinson Car Coupler Co.
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THE JANNEY FREIGHT CAR COUPLER

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Master Car Builders' Standard in every particular. Combines the greatest obtainable strength and simplicity. Only Three Parts. Positive acting gravity lock and positive mechanical opening of knuckle. Absolute Central draft. Same movement that raises the lock throws open the knuckle.

Adopted as Standard by Several Leading Railroads After Severe Tests and Long Trials.

Sold with a GUARANTEE to Stand the Proposed M. C. B. Drop and Pulling Tests.

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The Lightest, Simplest and Least Expensive Coupler in the Market.

WEIGHT 180 POUNDS.

MEETS ALL THE REQUIREMENTS OF THE M. C. B. LINES AND TESTS.

LOCKING DEVICE SIMPLE, DURABLE AND EFFECTIVE

It Has but Four Parts and Cannot Be Opened by Accident.

KNUCKLE OPENS AUTOMATICALLY.

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MANUFACTURERS OF

CHILLED WHEELS OF ALL PATTERNS AND SIZES FOR EVERY SERVICE, AND WITH OR WITHOUT AXLES.

CAPACITY, 400 WHEELS PER DAY.

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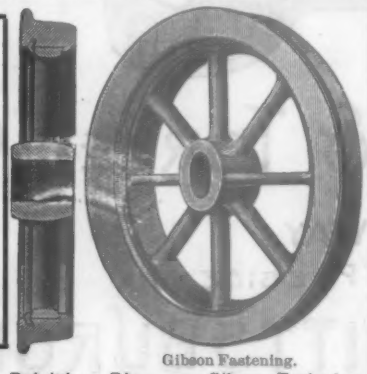
Spoke and Disc Steel Tired Wheels,

OF AMERICAN STANDARD.

For Locomotive Driving Wheels, Locomotive Tender and Truck Wheels and Passenger Car Wheels.

Fourteen years of constant service on the Pennsylvania R. R., and over 25 years of service on the most important roads of Europe is the record of our wheels.



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Adopted as Standard Wheel on some of the Principal Roads in this country. Apply for Catalogue.

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Double Plate, Single Plate AN Hollow Spoke WHEELS FOR Broad and Narrow-Gauge Cars Engines and Tenders.

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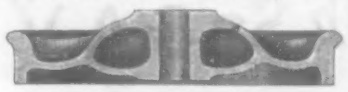

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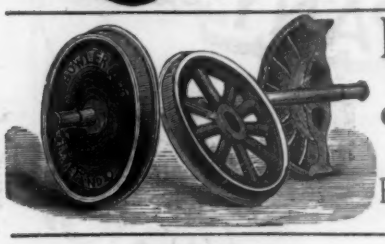

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Car Wheels of all Kinds and Sizes, with or without axles.

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Draw-Bars, Links and Pins, Follower Plates, Railroad Forgings, Arch Bars, Splice Bars, Track Bolts, Bridge Rods with Plain or Upset Ends, All Sizes.

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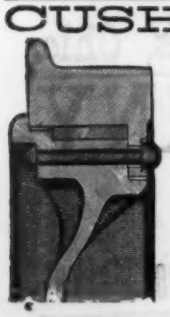

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For Parlor and Sleeping Cars, Passenger Coaches, Locomotive and Tender Trucks.

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WELDED TO

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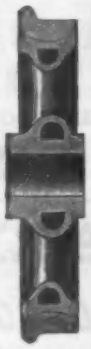

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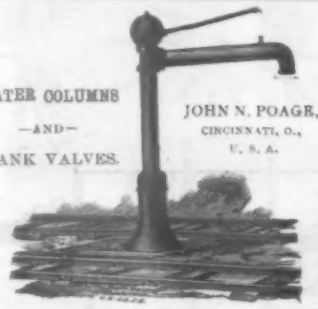
See Large Advertisement in Last or Next Issue of This Paper.

GATES IRON WORKS, 50n So. Clinton St., Chicago, Ill., U. S. A.



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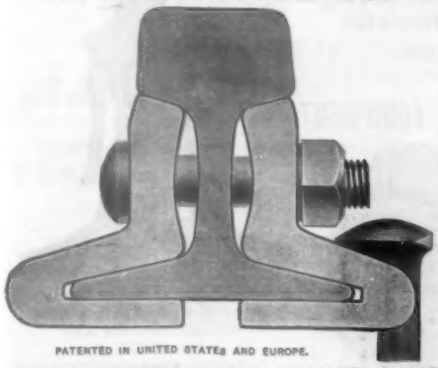
The Coming Joint for Steam Railroads,

ELECTRIC and CABLE STREET RAILWAYS.

IN SUCCESSFUL USE ON 48 ROADS.



PATENTED IN UNITED STATES AND EUROPE.

By its use the rail is made as strong at the joint as it is at the centre of the rail as it lies in track.

It is simple and easily applied, and has always given satisfactory results.

It is the safest joint to use, and cheaper in the long run than the angle bar.

It will increase the life of the rail over 25 per cent.

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THE JERSEY CITY WHEEL FOUNDRY AND MACHINE WORKS

HIGH GRADE CHILLED CAR WHEELS

ALL WHEELS GUARANTEED TO STAND 60,000 MILES

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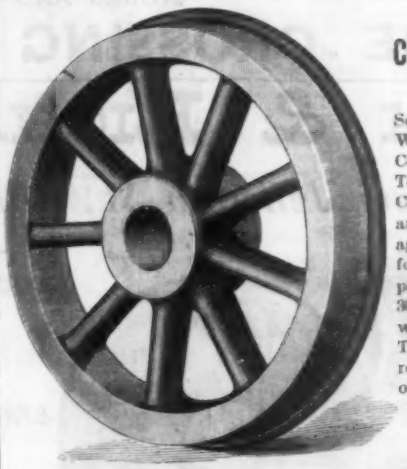

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Solid Steel Locomotive Driving Wheels, Solid Steel Driving Wheel Centres, Solid Steel Engine Truck and Tender Wheels, Solid Steel Passenger Car Wheels, turned on tread and flange and balanced, on which we give a mileage guarantee; also Solid Steel Castings for railroad use generally. The accompanying illustration shows our new 30-in. Spoke Engine Truck Wheel, which has a thickness of tire of 2½ ins. These wheels are making large mileage records on various railroads throughout the country.

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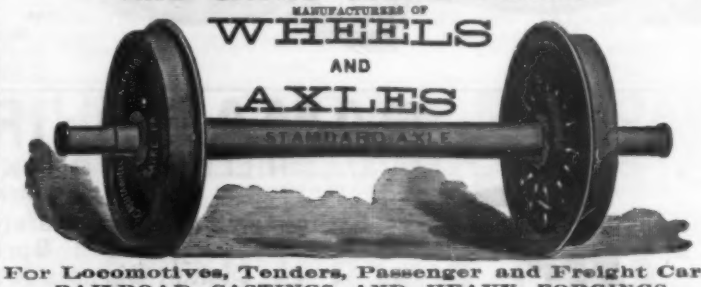

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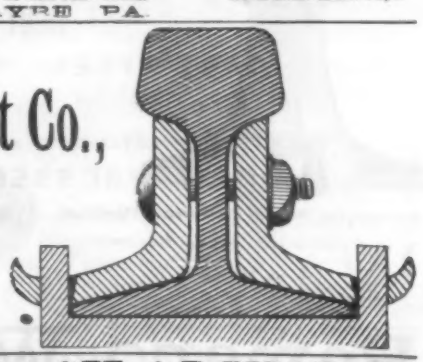

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Simple. Compact. Effective.

Piston of Air Brake Cylinder is automatically kept at any desired uniform stroke, resulting in full, effective piston pressure at all times.

ONE ADJUSTER PER CAR.

Uniformly applicable to any form of brake rigging, Passenger or Freight, whether brakebeams are outside or inside hung, etc., etc.

Illustrated Catalogue, with records of performance in service, upon application.

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THE MOST ECONOMICAL. ABSOLUTE SAFETY.

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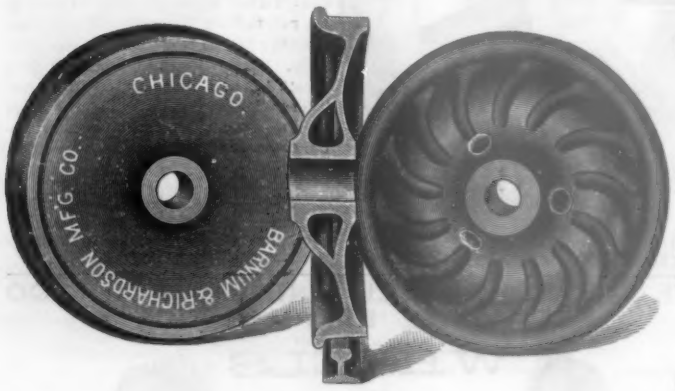

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STREET CAR WHEELS,

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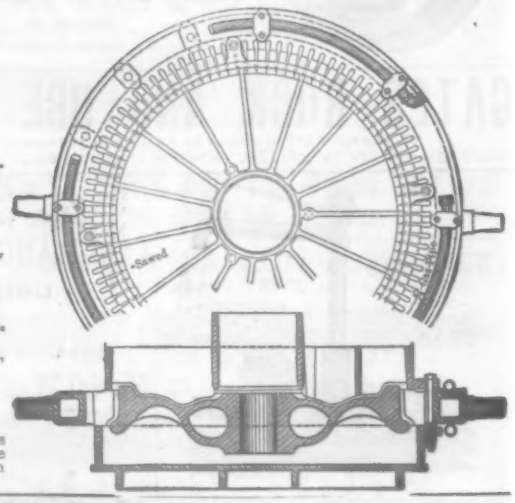
Machinery and Heavy Castings of all descriptions. Wheels are made perfectly cylindrical, uniform in chill, and with treads ground.



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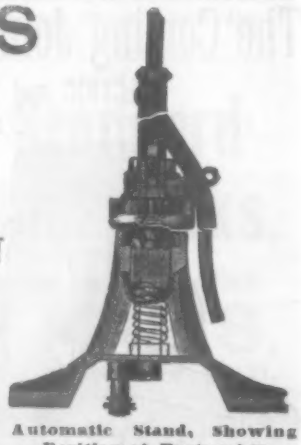
Switches, Automatic Safety Switch Stands, Yoked Frogs Bolted Plate and Spring Rail Frogs, Automatic Distant Signals Interlocked with Switches, Crossings of Every Description.

LIGHT AND HEAVY CASTINGS AND GENERAL TRACK EQUIPMENT

Automatic Stand, Showing Position of Parts while being Thrown by Hand

RAMAPO "YOKED FROG."



Automatic Stand, Showing Position of Parts while being Thrown Automatically by Train.

Ramapo Wheel & Foundry Company

MANUFACTURE

CHILLED IRON CAR WHEELS

FROM SPECIAL QUALITY CHARCOAL IRON

FOR

Drawing Room and Sleeping Coaches, Locomotives, Tenders and Passenger and Freight Cars.

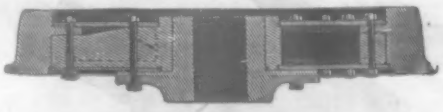
Congdon Brake Shoe. Raoul Journal Box.

FOR DRIVERS AND CAR WHEELS STEEL TIRED OR CHILLED
BRAKE SHOES
FOR OHIO AND WESTERN STATES
MADE BY
CONGDON BRAKE SHOE CO.
CHICAGO ILL.
FOR OHIO AND EASTERN STATES.
ROSS-MEEHAN SHOES MADE BY RAMAPO IRON WORKS
CONGDON SHOES MADE BY RAMAPO WHEEL & FDY CO
FOR CHILLED IRON CAR WHEELS

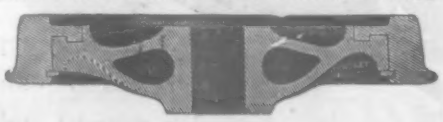
Snow's Rigid Steel-Tired Wheels,

WITH TIRES HAVING ANNULAR WEBS.

BOLTED--WITH WROUGHT-IRON PLATES, CAST-IRON CENTRE AND INTERCHANGEABLE HUB.



BOLTLESS--WITH CAST-IRON DOUBLE PLATE OR SPOKE CENTRE AND WEDGE-SHAPED RETAINING RING.



Both of these Wheels can be Re-tired in any Ordinary Machine Shop

OFFICE AND WORKS, RAMAPO, N.Y

DON'T MAKE MISTAKES,

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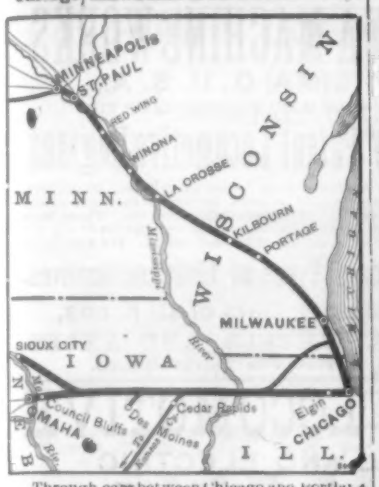

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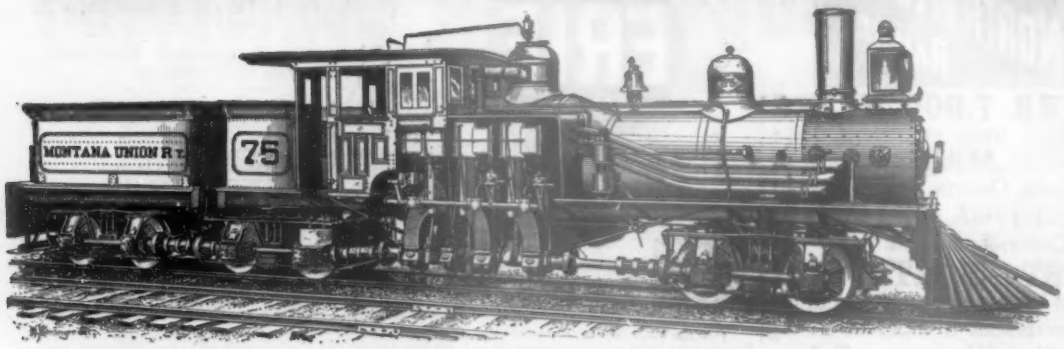

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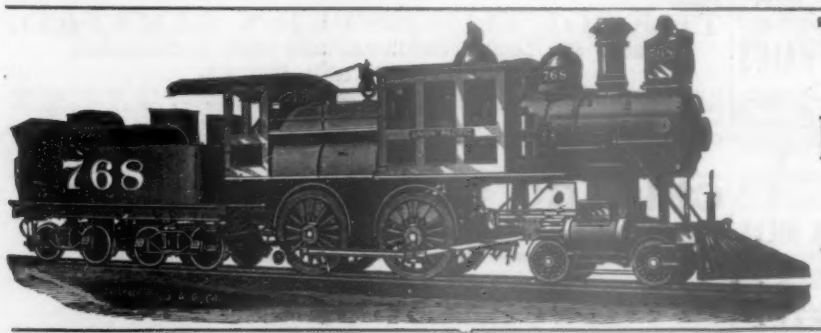

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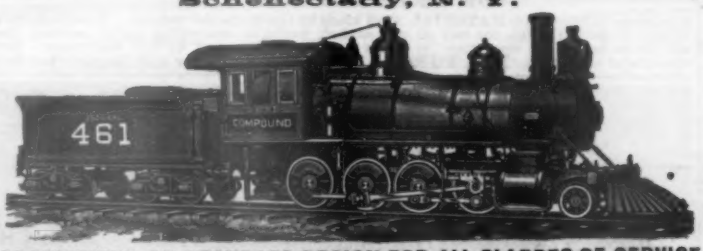

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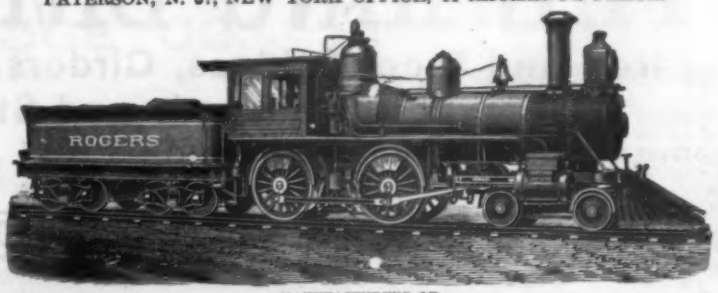

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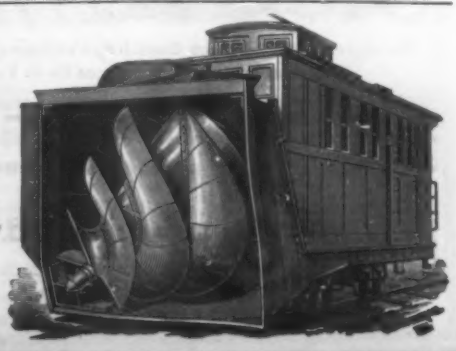

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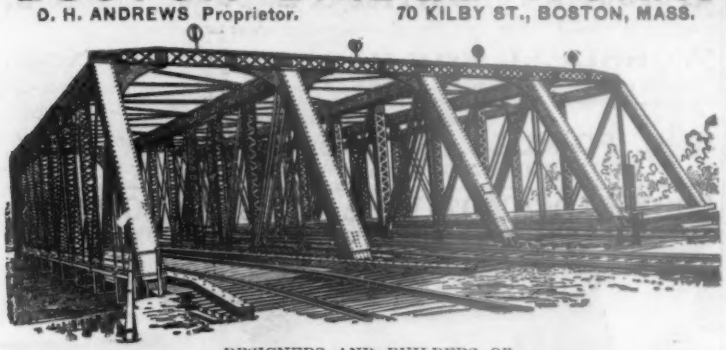

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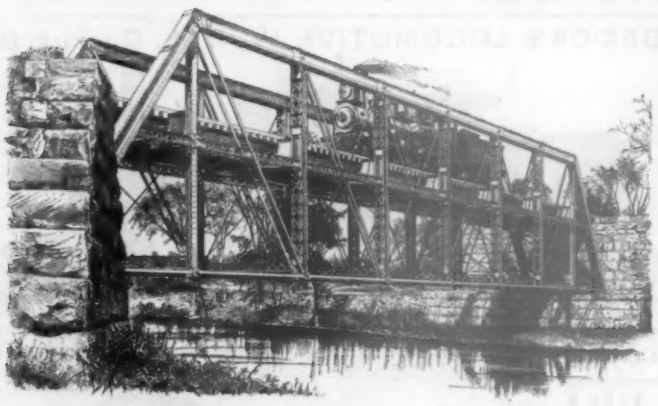

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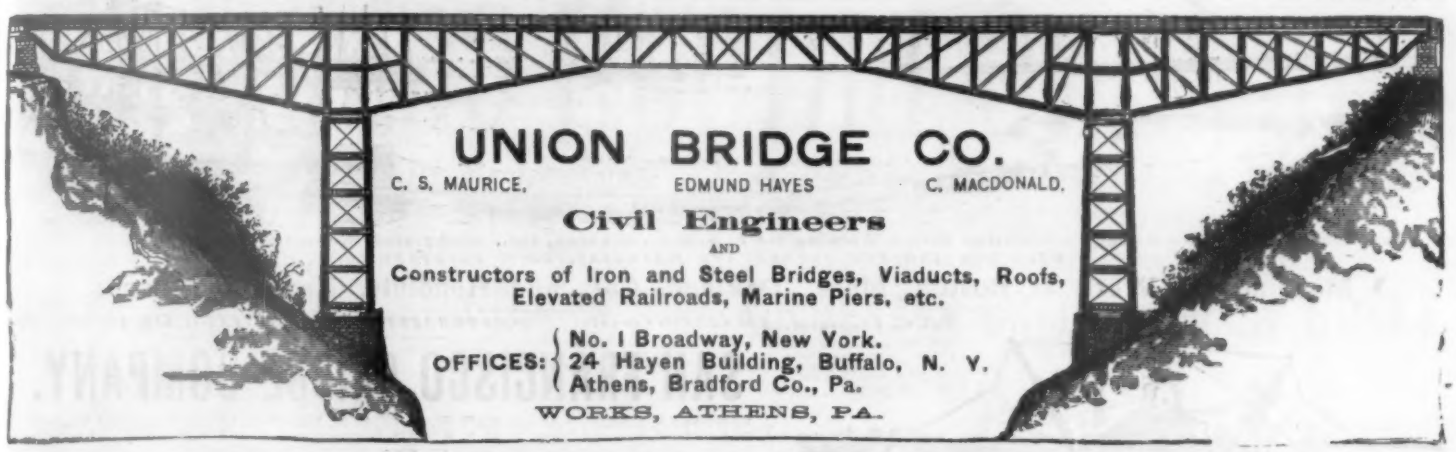

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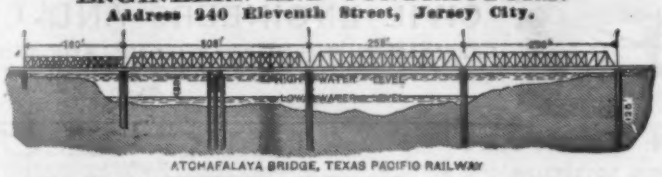

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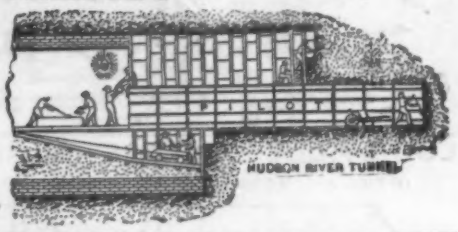

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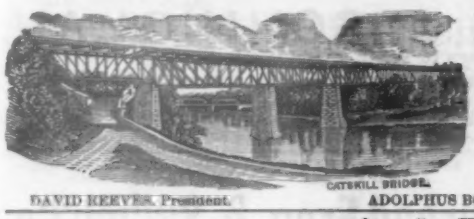

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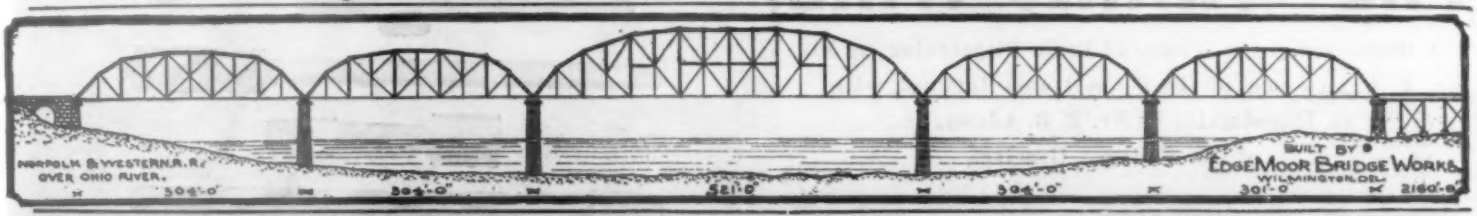

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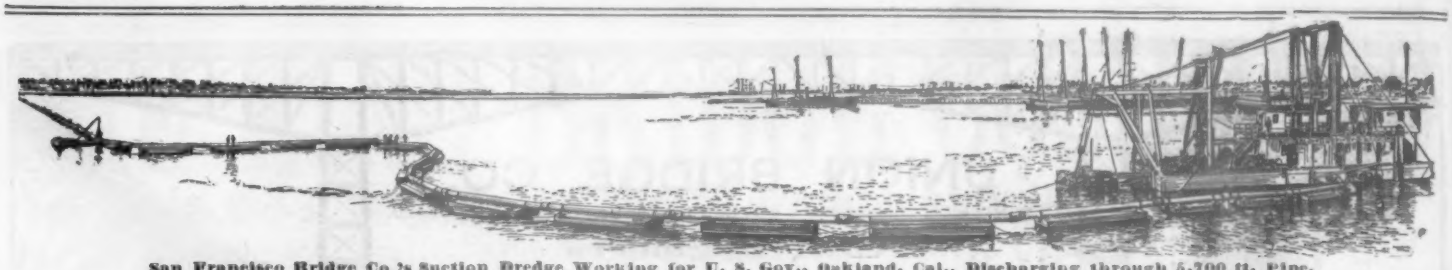

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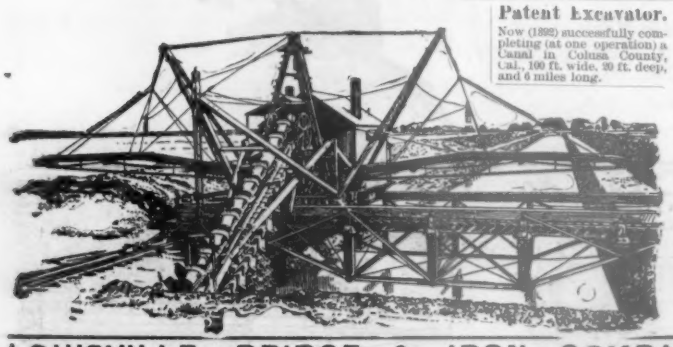

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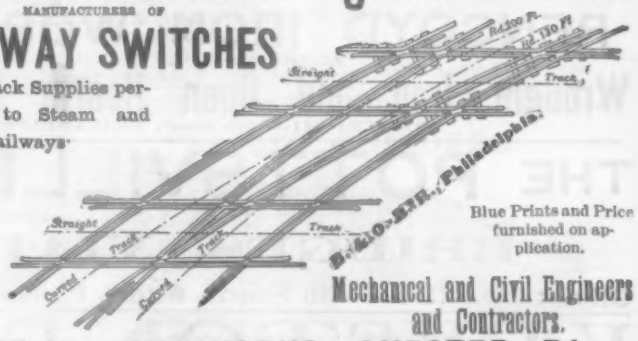

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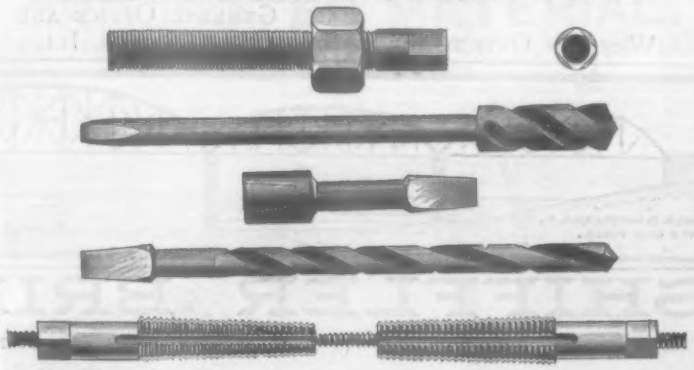

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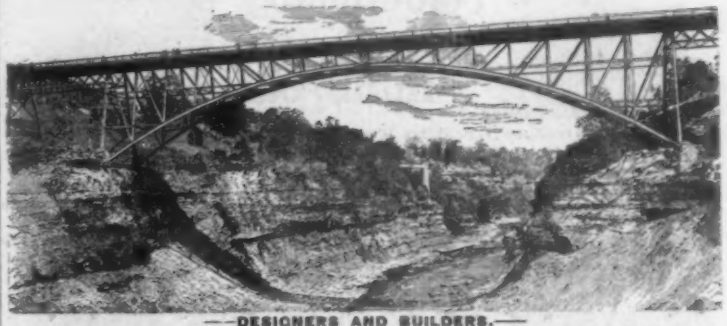

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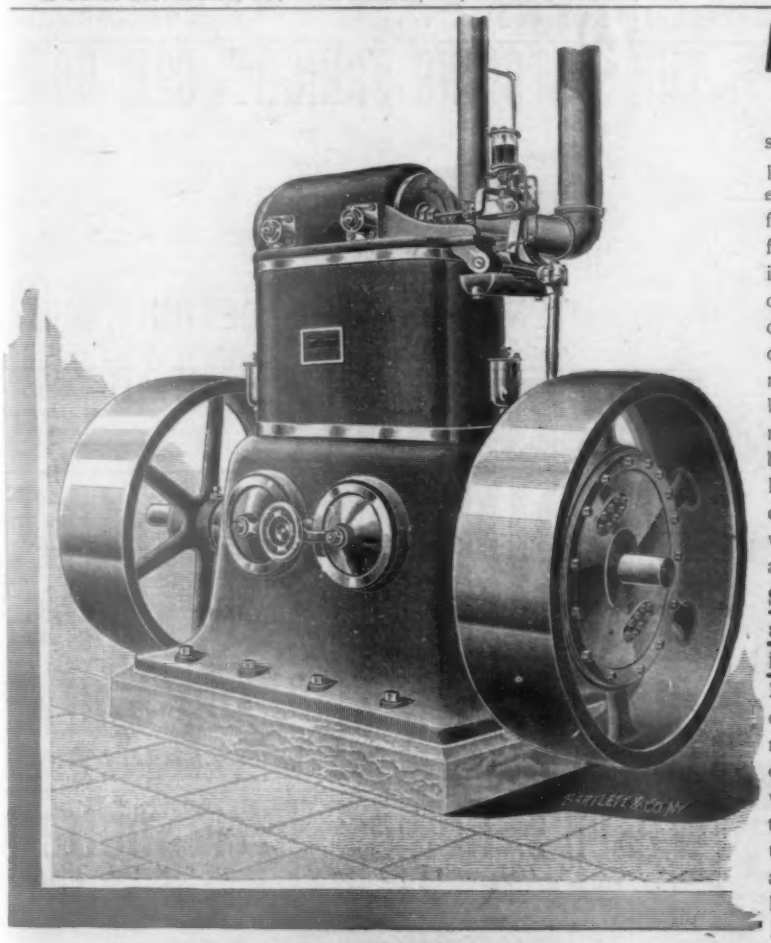

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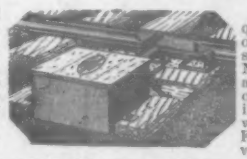
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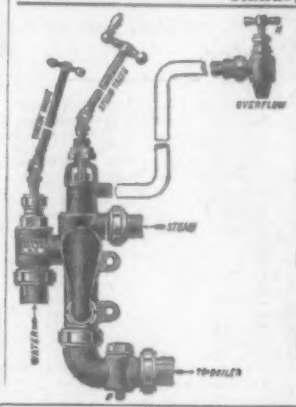

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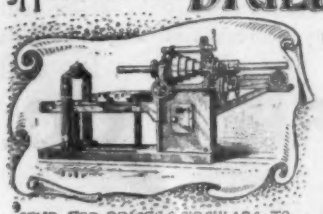
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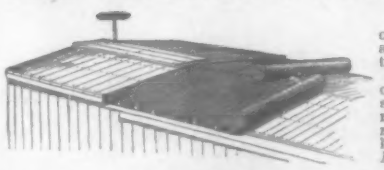
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